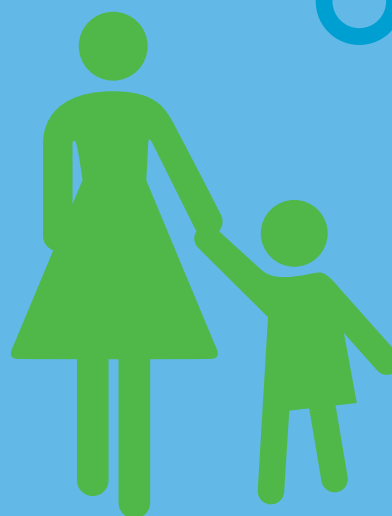
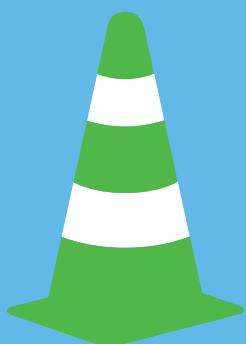
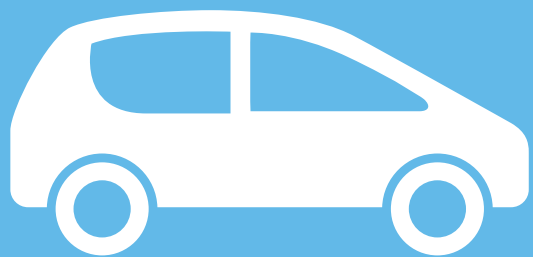


Research Projects and Studies 2001-2008



**A BACKGROUND DOCUMENT FOR THE PREPARATION OF
THE STRATEGIC GUIDELINES FOR ROAD SAFETY UP TO 2020**

Authors:

This report is based on the work performed by Giulia Roman during her internship at the EC from Bocconi University, Milan, supervised by Maria Cristina Marolda at the Transport and Energy General-Directorate.

A great deal of additional information on the European Union is available on the Internet. It can be accessed through the Europa server (<http://europa.eu>).

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Research Projects and Studies on Road Safety 2001-2008

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THE STRATEGIC GUIDELINES FOR ROAD SAFETY UP TO 2020**



Table of contents

Introduction	4
Road Safety research: challenges and opportunities	5
A huge investment and a multitude of results	6
European Research Framework Programmes (FP5, FP6, FP7)	6
The added value of the endeavour	7
Political implications and impacts	8
The Fifth Framework Programme 1998-2002	8
The Sixth Framework Programme 2002-2006	10
The Seventh Framework Programme 2007-2013	13
Project Showcase	15
The Fifth Framework Programme 1998-2002	17
The Sixth Framework Programme 2002-2006	23
The Seventh Framework Programme 2007-2013	30
DG TREN Studies and Campaigns on Road Safety	35
Studies commissioned by Road Safety Unit DG TREN	36
Grants awarded by Road Safety Unit DG TREN	41
Sensibilisation Campaigns	52
European Commission Research and Technological Development Framework Programmes funded projects on Road Safety 2001-2008	55
FP5 Projects funded by DG TREN	56
FP5 Projects funded by DG RTD	61
FP5 Projects Financed by the IST Programme	65
FP6 Projects funded by DG TREN	70
FP6 Projects financed by DG RTD	72
FP6 Infrastructure Projects funded by DG RTD	73
Infrastructures Research in FP6	74
FP6 Projects funded by IST Programme	76
Road safety researches FP7 – DG TREN	84
Road safety researches FP7 – DG RTD	84
ICT Projects FP7 – DG INFSO	86



Introduction

Art. 163 of the Treaty establishing the European Community reads: *'The Community shall have the objective of strengthening the scientific and technological bases of Community industry and encouraging it to become more competitive at international level, while promoting all the research activities deemed necessary by virtue of other chapters of this Treaty.'*

Research is the cornerstone that supports competitiveness and sustainable development in line with the three pillars of the Lisbon Agenda (economic, social and environmental). Quality research, which engages with societal stakeholders and communicates in ways that are perceived as being trustworthy and relevant, is a pre-condition for a knowledge-driven economy, and a major contribution to developing robust and sustainable solutions to complex systems. Moreover European Research is contributing to the development of educational horizons, new skills and to the creation of high value-added knowledge-based jobs.

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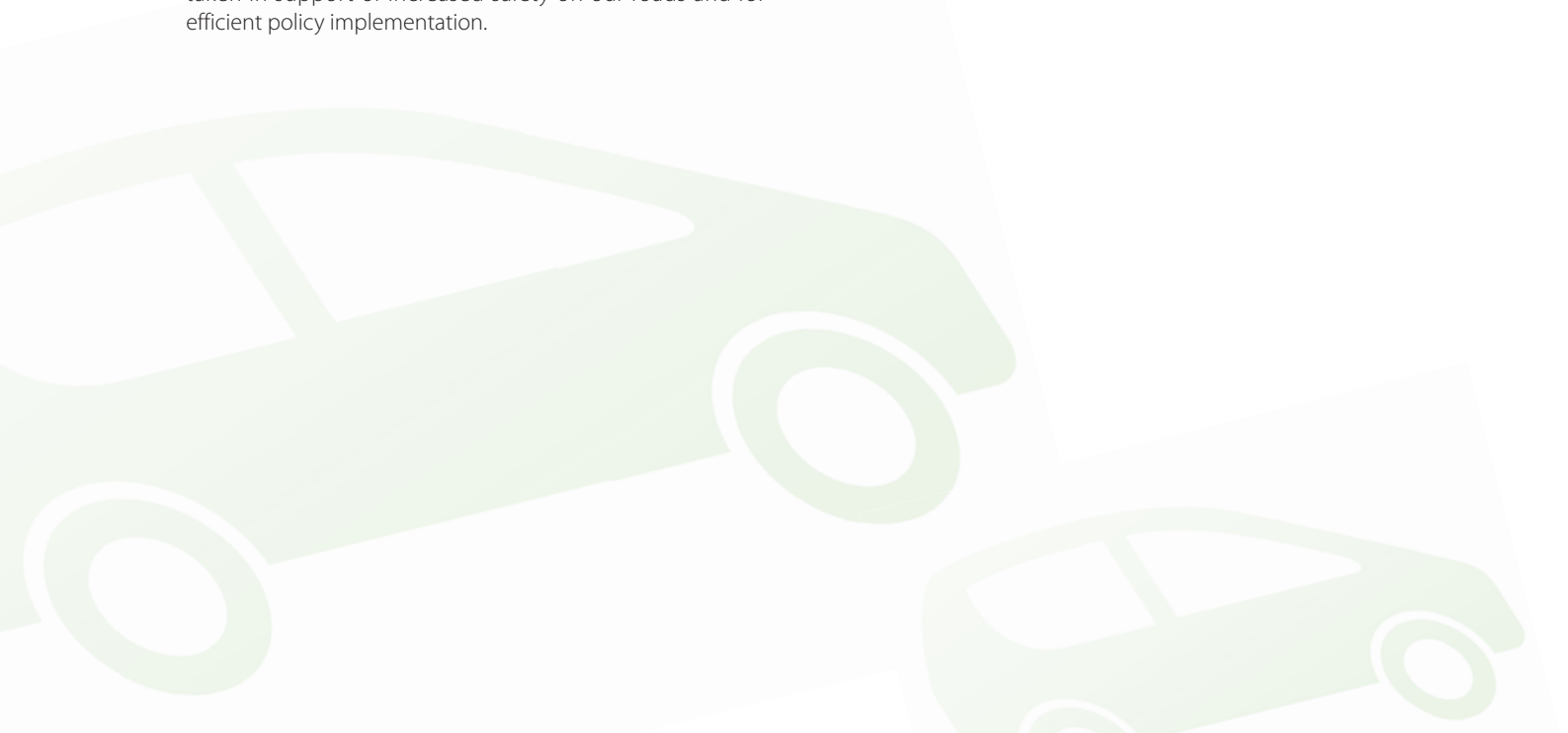
All these aspects are considered as paramount for the development and implementation of an effective Road Safety policy, which is an opportunity to demonstrate the benefits for EU citizens stemming from European research.

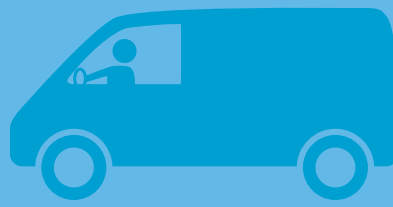
This paper highlights challenges and opportunities in road safety research in Europe, describing the contribution from the European Community's Research Framework Programmes as well as from other research activities at European level and their impact on road transport safety sector. Consideration is also given to new activities that could or should be undertaken in support of increased safety on our roads and for efficient policy implementation.

The development of future policies demands early scientific input. Well-communicated research provides knowledge which enables the formulation of realistic and enforceable regulations and the creation of new opportunities. The dimension and mechanisms where research can provide support should be specifically considered within each policy area.

The successful implementation of Road Safety policy, for example, is dependent also on research and science-based advice. The Scientific Support to Policy theme under the European Community's Sixth Research Programme has proven to be a successful tool; considerable benefits arose from this activity, which proved to be a cost-effective mechanism, capable of effectively integrating new knowledge and management tools into policy actions (*see 'Projects funded under FP6'*).

Activities carried out under technology-driven schemes have also improved the level of scientific knowledge necessary to develop and use new devices, construction methods, and methodologies aimed at improving in general safety on roads. These results are setting new trends in technology development and industrial production, which can have an important impact on future policy making. Attention should be given to such developments, in order to be able to make the right decisions to support the deployments of the most promising in terms of social effects.





Road Safety research: challenges and opportunities

Transport is a key sector for industrial development and social integration of regions and countries. Road transport in particular, due to its flexibility and capillarity characteristics, is one indicator of economic performance.

A safe and reliable road transport system is, therefore, of major importance for communities and individuals, and it is at the centre of a number of socio-economic sectors, such as industry, energy, environment, employment and trade.

Today we are facing a number of **challenges** at different levels:

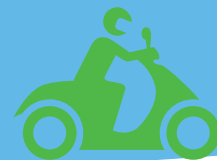
- increased urgency regarding **environmental protection**, with the consequent attention on energy production and consumption;
- the **globalisation** of culture and production, which jeopardises the competitiveness of the internal market;
- an enlarged need for **security**, both at institutional and individual level;
- the necessity to preserve **jobs and employment** against an unprecedented degree of immigration and **delocalisation** of production centres;
- a profoundly **changing society**, where the number and role of elderly and women are changing and deeply impacting traditional employment and mobility patterns;
- a new model of **governance**, where knowledge, education and awareness need to be disseminated throughout the society to support a novel **decision-making** mechanism that involves the population at large.

All these elements impact all policy-making activities, which are more interconnected than ever. Road Safety, being at the centre of a number of policies, must also take all these elements into consideration. Solutions to these challenges can be found with an increased level of general knowledge, which is supported primarily by research and development activities.

Besides giving the necessary scientific basis for sound policy decision-making processes; European research activities offer a valuable amount of other **opportunities** to face today's major issues:

- European-wide partnerships are the principal step towards consensus and harmonisation of innovative solutions;
- wider collaboration can accommodate different 'components' of the main theme, thus endorsing a more holistic and cross-cutting approach;
- new implementation instruments and mechanisms allow a direct participation of all stakeholders at every phase of the innovation process, allowing for a quick take over of scientific results in the relevant domain (political, industrial, social).

The EC Research and Technological Development Framework Programmes have been designed and structured to offer European governments, institutions and citizens the best schemes to achieve the maximum benefit from the effective implementation of the knowledge society Europe is pursuing.



A huge investment and a multitude of results

European Research Framework Programmes (FP5, FP6, FP7)

The EC Research and Technological Development Framework Programmes

The Framework Programme (FP) is the EU's main instrument for research funding in Europe. The FP is proposed by the European Commission and adopted by the Council and the European Parliament following a co-decision procedure. FPs were started in 1984 and the scope and content has been adapted throughout the evolution of the European Community and aimed at responding to the emerging challenges of European society.

In this report attention will be given to the last three FPs (FP5 and FP6 and the ongoing FP7) and to projects covering the period from 2001 to 2008.

The total amount of **EC financial support** to research activities in the field of road safety is **over € 550 million** representing a **total value** of projects close to **€ 900 million**. It has been calculated that, on average, each Euro invested in Community research generates a return of € 7. The total value of such

endeavour is easily calculated. Such a huge investment has led to many valuable results, whose correct and full exploitation can contribute to future developments of policy measures in the sector.

The highest financial investment has been on industry-oriented R&D projects, whose results are ownership of the participating organisations that will, in most cases, bring them to the market. Wise policy making will ensure that the deployment of such results will be fully coherent and correspond to the strategic goals at the origin of the programmes that supported their development.

An overview of the different FPs' scope and targets is given in the following pages as well as examples of particularly impacting projects. A full list of EC funded projects on Road Safety is enclosed in annex to this report.

6



Financial investment in Road Safety Research Projects

	FP5		FP6		FP7 (1 st & 2 nd call)		TOTALS	
	Tot (M€)	EC funds	Tot (M€)	EC funds	Tot (M€)	EC funds		
DG TREN	59.07	-	60.40	-	7.30	-	126.77	-
	-	38.62	-	38.12	-	5.50	-	82.24
DG RTD	60.58	-	47.55	-	82.49	-	190.62	-
	-	35.09	-	29.84	-	63.40	-	128.33
Infrastructures	-	-	28.63	-	-	-	28.63	-
	-	-	-	16.24	-	-	-	16.24
DG INFSO	100.97	-	285.97	-	145.64	-	532.59	-
	-	53.83	-	161.71	-	94.45	-	310.00
Total value	220.62	-	422.56	-	235.44	-	878.63	-
EC contributions	-	127.55	-	245.93	-	163.35	-	536.81



The added value of the endeavour

The value of Framework Programmes cannot be evaluated solely on a monetary basis, although the investment has been very important in recent decades. Such Programmes have steered industrial and scientific attention towards political goals fixed by the Commission for the future of the Union.

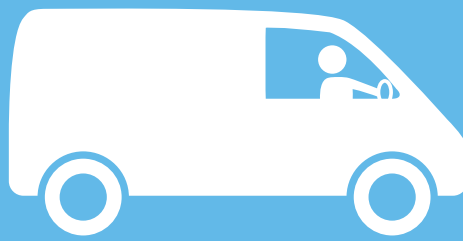
In particular, by analysing the results of the last three FPs, it is evident how the launch of specific activities has sparked a critical mass of researchers in specific domains of high political interest.

The emphasis on 'eSafety' under the FP6 is a perfect example. It is also interesting to follow the evolution of the Programmes' content, following the new political goals set throughout the years; from the initially industry-oriented programmes, to the societal problem-solving targets, to a renewed vision of transversal issues to be tackled in a multidisciplinary and intra-sectoral way. All this is mirrored in changing budget distribution and projects convergence.

The differences in funding rules and mechanisms, and in particular the maximum allowed percentage of funding, show where private investment is a priority. However, increased funding shows the larger participation of public bodies, which are intuitively closer to societal problems. This could be one indicator of the socio-political impact of the different programmes over the years.

General information on the different Programmes' content and scope is given in the following pages and a detailed analysis of various portfolios is in the annex for a more comprehensive illustration of the theme.





Political implications and impacts

The EC Research and Development Programmes' structures have followed the EU's evolving political priorities. Scientific results on which future political accomplishments are built are needed to ensure a proper return of the huge investment made in research activities.

The main outcome of the Framework Programme projects is, by and large, technological development, be this in new products, processes or services. Many of these are prone to influence future users' behaviour and societal needs. In turn, such changes could require a legislative/regulatory intervention in order to rule market and usage requirements, which are evolving according to the introduction of such novelties.

The massive development arising from the eSafety programme, for example, leads to radical changes in society stimulated by the introduction on the market of the resulting technologies. Consideration should be given to the consequent regulatory needs that may occur.

An important part of the funded research was also meant to directly support decision-making. Research outcomes should

be directly exploited to scientifically corroborate a number of actions also providing support for a wider societal acceptance. Some examples of such research activities are given in the 'Project Showcase' to illustrate the above.

It is also interesting to see how the 'integrated approach' to road safety, introduced by the Commission's Third Road Safety Action Plan, has given impulse to a renewed approach to related research themes. In this way a valuable outcome of research projects could confirm the significance of the various components of the road transport system, such as infrastructures and users, and indicated ways where improvements and progresses are needed. In this respect a valid example is given by the research activities on road infrastructure carried out by DG RTD under FP6.

The field of Road Safety is then one of the sectors where a consistent and thoughtful exploitation of synergies and complementarities between the Community activities can be made evident. This is even more true because it is a sector of great social impact and that is calling on each individual's direct interests and commitment.

8

The Fifth Framework Programme 1998-2002

The Fifth Framework Programme (FP5) sets out the priorities for the EU's research, technological development and demonstration (RTD) activities for the period 1998-2002. These priorities have been selected on the basis of a set of common criteria reflecting the major concerns of increasing industrial competitiveness and the quality of life for European citizens.

FP5 differs considerably from its predecessors. It was conceived to **help solve problems and to respond to the major socio-economic challenges** facing Europe. To maximise its impact, it focuses on a limited number of research areas combining technological, industrial, economic, social and cultural aspects. Management procedures have also been streamlined with an emphasis on simplifying procedures and systematically involving key players in research.

The four Thematic Programmes included in the 'first activity' (see table) cover a series of well-defined problems. Transport issues are included in the second (IST) and third (Growth) programmes, which will be analysed in detail.

Thematic Programmes

Activity	Programmes
First Activity Research, technological development and demonstration programmes.	→ Quality of life and management of living resources. → User-friendly information society. → Competitive and sustainable growth. → Energy, environment and sustainable development.



Transport in FP5

Research themes on transport are included in the second and third thematic programmes: 'User-friendly information society' and 'Competitive and sustainable growth'. The global budget for these thematic areas was respectively € 3.6 billion and € 2.7 billion.

IST

The Programme **Creating a user-friendly information society (IST)** main objectives were to realise the benefits of the information society for Europe both by accelerating its emergence and by ensuring that the needs of individuals and enterprises are met. The programmes' inter-related research objectives focus both the technology developments of the information society and enable the close articulation between research and policy needed for a coherent and inclusive information society.

The Programme was structured in four **key actions**. Under the first one, 'Systems and services for the citizen' specific activities relating to transport and tourism could be found under the heading **'the Information Society on the Move'**: As demand for mobility and transport increase throughout Europe, the public requires more information and better services as well as safer and cleaner transport alternatives to meet their needs. The transport and tourism activity managed and funded projects to stimulate and facilitate research and technological development in this area. To create synergy, visibility and/or critical mass, funded projects sharing common themes were organised into co-operative **'clusters'**.

Mobility and Intelligent Infrastructure for Transport: intelligent transport infrastructures are paramount to making a significant contribution to solving problems related to congestion, accidents and pollution faced during transport and travel. Research in IST and the work undertaken in this cluster have contributed to safer, cleaner and more efficient transport, and helped to rationalise energy use – thereby reducing environmental pollution. In addition, people on the move will enjoy increasing access to a range of info-mobility services in line with IST's stated objective of having ubiquitous access.

The global project portfolio of this cluster included 40 projects for a total value of € 101.8 million and global EC funding of € 54.2 million.

Intelligent Vehicles: across all modes of transport, safety, security, efficiency and comfort must be seen as primary considerations. On Europe's roads, traffic accidents and delays are two areas under close scrutiny. Work here concentrated on active safety systems augmenting driver performance and on passive safety measures. This cluster takes a comprehensive

view of safety, ranging from the monitoring of road driver alertness, collision warning systems, lane and distance keeping, to cooperative and autonomous driving systems. In-vehicle platform integration is an important industrial issue, raising questions of standardisation and compatibility of components.

The project portfolio of this cluster covered all transport modes (including rail, water and air) and consisted of 35 projects for a total value of € 56.2 million and a global EC funding of € 29.9 million.

Projects related directly to Road Safety are listed at the end of this report and some case studies are presented under the 'Project Showcase' chapter to show the main technological developments and their policy decision making implications.

GROWTH

The main targets of the Competitive and Sustainable Growth Programme were to produce, disseminate and use the knowledge and technologies needed to design and develop processes and to produce high quality, environment- and consumer-friendly products competitive in future markets; to help increase economic growth and maintain and/or create new jobs in Europe; to sustain the continuing innovation and modernisation efforts of manufacturing, processing and services enterprises (including SMEs) so as to improve their competitiveness; to support the development and implementation of Community policies that enable competitive and sustainable development. This went hand in hand with the development of related services, including transport, which are economic, safe and protective of the environment and quality of life as well as with the development of quality materials, reliable measurements and testing methods and the optimal use of specific research infrastructures.

The Programme was structured in three main interconnected elements: a set of **four key actions**, (Innovative products, processes and organisation; Sustainable mobility and intermodality; Land transport and marine technologies; New perspectives for aeronautics) helping to develop critical technologies, concepts and policies to solve clearly identified problems; research and technological development activities of a generic nature; and support for research infrastructures.

The key action **'Sustainable mobility and intermodality'** included three RTD priorities, which contributed to achieving the policy goal of sustainable mobility, reflecting the three main components of a modern integrated transport system: a regulatory and accountable framework reflecting socio-economic objectives; an interoperable infrastructure which allows the operation of attractive, environmentally friendly and efficient transport means; and modal and intermodal systems for managing operations and providing services.



On the other hand the key action '**Land transport and marine technologies**' organised the research efforts around the development of critical technologies and their integration and validation around advanced industrial concepts in order to attain the following main deliverables: improved fuel efficiency and reduction of emissions; improved performance and; improved system competitiveness. This key action included

a number of research projects dealing with innovative construction technologies for road infrastructure, which considered as well their contribution to road transport.

See projects list and description at the end of the report, as well as road safety relevant case studies in the 'Project Showcase'.

The Sixth Framework Programme 2002-2006

Main aim of FP6 was to contribute to the creation of a true European Research Area (ERA). The ERA is a vision for the future of research in Europe, an internal market for science and technology. It fosters scientific excellence, competitiveness and innovation through the promotion of better cooperation and coordination between relevant actors at all levels. Economic

growth increasingly depends on research, and many of the present and foreseeable challenges for industry and society can no longer be solved at national level alone. At their summit in Lisbon in March 2000, heads of state and governments called for better leveraging of European research efforts through the creation of the ERA.

Structure of FP6

FP6 (EC part): Three Main Blocks of Activities	
Block 1: Focusing and Integrating European Research	
7 Priority Thematic Areas <ul style="list-style-type: none"> → Live sciences, genomics and biotechnologies health. → Information society technologies. → Nanotechnologies and nanosciences, knowledge-based functional materials, new production process and devices. → Aeronautics and space. → Food quality and safety. → Sustainable development, global change and ecosystems. → Citizens and governance in a knowledge-based society. 	Specific Activities Covering a Wider Field of Research <ul style="list-style-type: none"> → New and emerging science and technologies (NEST). → Research for policy support. → Specific research activities for SMEs. → Specific international cooperation activities.
Block 2: Structuring the ERA	Block 3: Strengthening the Foundations of ERA
<ul style="list-style-type: none"> → Research and innovation. → Human resources & mobility (Marie Curie actions). → Research infrastructures. → Science and society. 	<ul style="list-style-type: none"> → Coordination of research activities. → Development of research/innovation policies.

10

Block 1 – Focusing and Integrating Research

The bulk of expenditure under FP6 was centred on major research projects to be structured so as to have an integrating effect on Europe's research resources, resulting in a common endeavour. FP6 research projects required that the partners make a much greater commitment to a permanent structural change. The research was focused on specific themes, strategically important for Europe's future. These themes were not structured from the starting point of traditional research disciplines, but as strategic themes to be achieved through combination of scientific disciplines:

- Life sciences, genomics and biotechnology for health.
- **Information Society Technologies (IST).**
- Nanotechnologies and nanosciences, knowledge-based multifunctional materials, and new production processes and devices.

- Aeronautics and space.
- Food quality and safety.
- **Sustainable development, global change and ecosystems.**
- Citizens and governance in a knowledge-based society.

In addition, four cross-cutting activities ensured the coverage of a wide range of needs that cannot be satisfied within the thematic priorities:

- New and Emerging Science and Technology (NEST).
- **Research for policy support.**
- Specific SME activities.
- International Cooperation (INCO).

In particular the activities 'policy support and anticipating scientific and technological needs' had a distinct role within the



overall architecture of the Framework Programme 2002-2006. They involved common implementation arrangements, and the necessary critical mass, to assure efficient and flexible conduct of research which is essential to the fundamental objectives of Community research and which covers a wide range of needs that could not be satisfied within the thematic priorities. They included the following specific objectives:

- to underpin the formulation and implementation of Community policies, bearing in mind the interests of possible future members of the EU as well as the existing Member States, and monitor their effects;
- to explore new and emerging scientific and technological problems and opportunities, in particular interdisciplinary and multidisciplinary research areas, where European action is appropriate in view of the potential to develop strategic positions at the leading edge of knowledge and in new markets, or to anticipate major issues facing European society.

A feature common to these activities was that they should have been implemented within a multi-annual perspective taking direct account of the needs and viewpoints of the main associated actors (as appropriate: policymakers, industrial user groups, leading edge research groups, etc.). They were to be implemented in conjunction with flexible programming mechanism to be implemented during the course of the programme, by which specific priorities, corresponding to identified needs and falling within the objectives indicated above, could be determined.

The programming, carried out by the Commission, was based on suggestions received in response to a wide-ranging consultation of interested circles in the EU and the countries associated with the Framework Programme, regarding the topics to be included. They might include pre-normative research and measurement and testing where necessary for the needs of Community policies. Links between the different policy areas have been taken into account.

Transport in FP6

The complexity of the transport system was therefore addressed in an integrated and comprehensive way, through two complementary approaches, that were identified as *Research, technological development and integration and Research to support the European Transport Policy* 'Research to support the European Transport Policy' emphasised short-term implementation and exploitation of results. 'Research, technological development and integration' focused on the development of new technologies specific to surface transport and on their integration into future transport systems and products with a short-, medium- and long-term perspective.

IST

The objectives of IST under FP6 were to increase innovation and competitiveness in European business and industry and to contribute to the greater benefit of all European citizens. This thematic area focused its efforts on the future generation of technologies in which computers and networks will

be integrated into the environment, making a multitude of services and applications accessible through easy-to-use human interfaces.

Two Strategic Objectives embraced development of components and systems for transport, under the overall heading **eSafety**:

eSafety for Road and Air Transport: to develop, test and assess an integrated and global approach to intelligent road vehicles and aircraft which offers higher safety and value added services, where interactions between the person in control, the vehicle and the information infrastructure are addressed in an integrated way. Focus was on:

- research on advanced sensors and communication systems as well as highly dependable software and interfaces to integrate on-board safety systems that assist the driver in road vehicle control; and advanced airborne collision avoidance systems for aircraft;
- for road transport, research in distributed intelligent agents, secure communications and advanced positioning and mapping technologies and their integration for supporting the provision of location based value added services;
- for road and air transport, work on vehicle and information infrastructure management systems with emphasis on safety and efficiency.

eSafety – Cooperative Systems for Road Transport:

aimed at developing and demonstrating cooperative systems for road transport that will make transport more efficient, safer and more environmentally friendly. Cooperative Systems (as an extension to autonomous or stand-alone systems), in which vehicles communicate with each other and the infrastructure, have the potential to greatly increase the quality and reliability of information available about the vehicles, their location and the road environment, enabling new and improved services for the road users, thus enhancing the support available to drivers and other road users and providing for:

- greater transport efficiency by making better use of the capacity of the available infrastructure and by managing varying demands;
- increased safety by improving the quality and reliability of information used by advanced driver assistance systems and allowing the implementation of advanced safety applications.

SUSTAINABLE SURFACE TRANSPORT

Under the thematic priority 'Sustainable development, global change, and ecosystems' sustainable surface transport plays a key role in people's everyday lives and is a decisive factor in economic competitiveness and employment. The promotion of its sustainable development without sacrificing either economic growth or the freedom of movement has become a central objective of the European Union policy.

Surface transport has to face the challenge of supporting future economic development and subsequent traffic increase without degrading the quality of transport services and while protecting the environment. Research and technology



developments have an important role to play and are providing the European Transport System with innovative vehicle and vessel technology and new forms of transport organisation and infrastructure.

The sustainable surface transport work programme proposed a set of research objectives which could implement the content of the Gothenburg declaration of June 2001 and the Commission White Paper on European Transport Policy 'European transport policy for 2010: time to decide'.

Among the objectives as defined in the Specific Programme (New technologies and concepts for all surface transport modes; Advanced design and production techniques; Rebalancing and integrating different transport modes; Increasing road, rail and waterborne safety and avoiding traffic congestion). Objective four was focused on Road Safety, addressing three domains:

Road safety strategies: support for research combining measures and technologies for prevention, mitigation and investigation of road accidents placing special attention to risky and vulnerable users groups, including children, handicapped persons and the elderly (accident analysis and injury analysis; driver safety training; road infrastructure safety; enforcement of traffic rules and drivers' aptitude to drive; awareness campaigns and acceptability of measures).

Integrating Intelligent Transport Systems: support to a wide array of technologies, meant to change the face of the transport system. Particular attention was paid to the close coordination with Information Society technologies thematic priority, which addressed also Smart Transport Systems development. In this context, Galileo applications were particularly encouraged and scrutinised. Two particular actions were foreseen: European service for electronic fee collection on roads and multimodal real-time information for people on the move.

POLICY ORIENTED SUPPORT

The overall objective was to support the formulation and implementation of Community policies, by providing scientific contributions to policies targeted precisely on needs ('demand-driven'), coherent across the various Community policy areas, and sensitive to changes in policies as they take place.

Under this part of the programme, research to support Community policies was organised as an integrated activity, according to specific principles designed to ensure:

- timely and effective scientific inputs, covering a wider field of policies than in the past, and with the prospect of improved information, exploitation and uptake of results, at national and EU level;
- a coherent research base reflecting the increasing integration of Community policies and of the science that underpins them;
- systematic improvements in the relationship between research and policy at all levels in the EU;
- development of the European Research Area, by encouraging a single 'playing field' in relation to policy-related research.

The activities under this section of the programme were diverse in their subject matter and were implemented in such a way as to ensure coordination across the various topics and complementarity with the thematic priority areas.

Research projects financed under this activity were expected to respond to the specific requirements of the tasks set out under each of the subject headings. The tasks often involved requirements to address different disciplinary aspects, in view of the increasingly integrated nature of Community policies.

Energy and transport play a key role in people's lives and are a decisive factor in economic competitiveness and employment. The promotion of sustainable development including its economic growth dimension and continued freedom of movement is a central objective of EU policy. Reaching this objective requires comprehensive policy measures, voluntary agreements, financial schemes and support to research and development. These were at the heart of the Commission proposals presented in the *Green Paper* 'Towards a European strategy for the security of energy supply', and in the *White Paper* 'European transport policy for 2010: time to decide'.

In setting out different options, these policy documents clearly identified the main factors contributing to current unsustainable development patterns. The continuous increase in energy and transport demand and their growing dependence on imported fuels, notably oil, is undermining the sustainable development of the European economy. Growing congestion, a succession of accidents and energy supply crises had in turn highlighted the risk of disruption in flows both in energy supply chains and in mobility systems.

Research was therefore needed to deliver realistic solutions that support policy monitoring and forecasting and facilitate/enhance the implementation of the transport and energy policy measures and instruments. Research focused on monitoring the implementation of the European transport and energy policies through an efficient, rapid and secure access to reliable and harmonised data and enhanced forecasting tools, and assessing the impacts of individual policies and policy packages in terms of sustainability indicators and harmonised approaches. In particular, research had the following objectives: improve European transport models and forecasts (refining the demand analysis, linking with energy models); define/measure the quality of service of the transport system (reliability, congestion, bottlenecks, etc.); improve energy models and data sources to evaluate the effects of regulatory action, fiscal measures or other policy instruments on energy security, competitiveness and environment protection; improve appraisal methods and tools; determine sustainability indicators and targets (modal shares, decoupling, shares of renewables, etc.); analyse, develop and disseminate innovative policy packages and best practices designed to reach the targets defined.

Research under this area complemented and took into account the research carried out under the thematic priorities, in particular under Priority 6 (Sustainable development, global change and ecosystems/Sustainable Surface Transport).



The Seventh Framework Programme 2007-2013

The Seventh Framework Programme (FP7) sets out the priorities for the European Union's research, technological development and demonstration (RTD) activities for the period 2007-2013. Its duration has been extended to a seven-year period in order to allow **innovation** to be effectively generated by the projects funded under this scheme. The programme, with its total budget of € 50 billion, is a key tool for helping Europe to respect Lisbon Strategy and to maintain leadership in the global knowledge economy.

FP7 has two main strategic objectives:

- Strengthen the scientific and technological base of European industry.
- Encourage its international competitiveness, while **promoting research that supports EU policies**.

It is structured in five main specific programmes:

- **COOPERATION** is the core of FP7 and represents the two-thirds of the overall budget. It has to be implemented by transnational consortia.
- **IDEAS** supports 'frontier research' on the basis of scientific excellence and there is no obligation for cross border partnerships.
- **CAPACITY** focuses on research capacities that EU needs to enhance (people, enterprises and infrastructures).
- **PEOPLE** supports researchers' mobility and career development.
- **EURATOM** (Nuclear research) has two specific programmes, fusion energy research, nuclear fission and radiation protection, and covers the activity of the JRC (Joint Research Centre) in the field of nuclear energy.

A mid-term review of FP7 is planned in order to assess both its implementing mechanisms and its impact on society and the economy.

The results of the first two calls for proposals (2007 and 2008) have already given rise to over € 170 million funding in the field of Road Safety.

Transport in FP7

The COOPERATION specific programme consists of ten thematic areas, two of which directly deal with issues related to transport and road safety.

TRANSPORT

For the first time this area acquires an identity, becoming a full stand-alone programme.

Objective:

'Based on technological and operational advances and on European transport policy, develop integrated, safer, 'greener' and 'smarter' pan-European transport system for the benefit of all citizens and society and climate policy, respecting the environment and natural resources; and securing and further developing the competitiveness attained by the European industries in the global market.'

Considering the differences inside transport sector this theme is divided into three sub-themes:

- Aeronautics and air transport.
- Sustainable surface transport.
- GALILEO.

Attention is also given to synergies between the three sub-areas, as they can help to improve competitiveness and to respond to the challenges of transport system.

In 2007 for the first time since FP inception all modes of transport have been gathered together under one single theme. This change allows approaching transport in its systemic entirety considering all its components in an integrated way. It considers the 'system': the different transport modes, their components (vehicle/vessel/aircraft; infrastructure and users) and their reciprocal interactions and interfaces, including logistics. It embraces 'integration' between research, innovation and policy; between disciplines, technologies and skills; and between a variety of funding sources and between a broader range of stakeholders. Its approach is in line with the major EU challenges, industrial needs and policy objectives: the **greening** of the transport system; encouraging **co-modality**; sustainable **urban mobility**; improved **safety and security**; strengthened **competitiveness**; without underestimating societal needs and social change.

Following both the 2005 revised Lisbon Objectives and the concept of the European Research area (ERA), research has to contribute to innovation, delivering results that can be exploited for the benefit of society. Research has to deliver intelligent roads and intelligent vehicles able to interact and communicate with the driver and to make travelling safer. The approach of the FP7 transport theme is '... addressing the challenge, by considering the interactions of vehicles or vessels, networks or infrastructures and the use of transport services'.

ERA embeds the idea to obtain the most from the European diversity, enriched by the recent accession of new countries. European regions and countries are progressively developing specialisations in different fields, but they are also able to gain access to the knowledge created elsewhere. One of the most effective way to encourage specialisation and, at the same time, the sharing of knowledge is to encourage the mobility of the researchers. A specific instrument aimed at the implementation of ERA is the **ERA-Net**. Launched under FP6 as a separate programme, they are now directly embedded in the cooperation themes, constituting an integral part of the thematic S&T research strategy. The ERA-Net projects, targeted national government institutions, can network four types of activities:

- Information exchange.
- Definition and preparation of joint activities.
- Implementation of joint activities.
- Funding of joint trans-national research actions.

in order to ensure a more coordinated approach to research planning and funding across the EU Member States.



ICT

Main objective of the **Information and Communication Technologies** theme is improving the competitiveness of European industry and enabling Europe to master and shape future developments in ICT so that the demands of its society and economy are met.

ICT is at the very core of the knowledge-based society. Activities will continue to strengthen Europe's scientific and technology base and ensure that ICT progress is rapidly transformed into benefits for Europe's citizens, businesses, industry and governments. These activities will also help reduce the digital divide and social exclusion. Achieving the best possible impact for Community support requires a focused and concentrated effort on key RTD challenges. This work programme proposes a structure built around seven challenges that should be addressed if Europe is to be among the world leaders in next generation ICT and their applications. The challenges are driven either by industry and technology objectives or by socio-economic goals. For each challenge precise targets and deliverables are identified in a 10 year time frame.

Challenge 6 is focused on **ICT for Mobility, Environmental Sustainability and Energy Efficiency**: ICT continues to provide new intelligent systems that assist the driver to avoid accidents, provide drivers with real time information to avoid congestion, and optimise a journey or the engine performance to improve energy efficiency. Autonomous on-board systems are complemented with vehicle-to-vehicle and vehicle-to-infrastructure cooperative technologies and improved, flexible traffic network management. The future transportation system needs cleaner and more efficient vehicles, energy-efficient intelligent infrastructure (including cooperative traffic control and management systems), as well as new mobility concepts. Improving safety remains a key objective.

Target Outcomes of the programme in the field of road safety are:

→ **ICT for Intelligent Vehicle Systems** for further improving road safety and overall performance of transportation systems. This includes advanced in-vehicle safety systems; systems supporting autonomous driving; new approaches to crash avoidance and collision reduction; human machine interface design principles; advanced methods for traffic situation detection and communication (including vulnerable road users). Projects need to take an integrated approach

to safety, considering together the infrastructure, vehicles, drivers and other transport users.

→ **ICT for Clean and Efficient Mobility** for further improving energy efficiency and reducing CO₂ emissions in all modes of transport including energy-efficient driving (eco-driving) based on on-board systems and/or cooperative infrastructure and energy-optimised, adaptive traffic control and management technologies and systems for urban areas and inter-urban road networks.

→ **Field Operational Tests for Integrated Safety Systems and Cooperative Systems** to assess improvements in the efficiency of the transport system, in the safety of all road users and in making individual mobility more comfortable. Projects need to collect statistically significant data allowing analysis of user acceptance, performance and benefits for road safety and efficiency of both autonomous on-board and cooperative systems.

→ **ICT-based systems and services for Smart Urban Mobility and new Mobility Concepts** to address the environmental footprint and safety of mobility, while fostering economic ICT tools and services for logistics optimised for urban environments; use of ICT for replacing mobility (virtual mobility, telepresence); and new, multi-modal urban mobility concepts.

The **Intelligent Car initiative** includes research agendas, dissemination of results (user awareness campaigns), assessments of socio-economic impact and training.

Expected impact

→ World leadership of Europe's industry in the area of Intelligent Vehicle Systems and expansion to new emerging markets, improving the competitiveness of the whole transport sector and the automotive industry.

→ Significant improvements in safety, security and comfort of transport.

→ Significant improvements in energy efficiency, emissions reduction and sustainability of transport.

→ Improved safety, efficiency and competitiveness of transport systems across Europe.

→ Optimised mobility of people and goods and improved quality of life in urban environments.

→ Wider uptake of intelligent vehicle systems and cooperative systems through proof-of-concept to all stakeholders in Field Operational Tests.



Project Showcase



The Fifth Framework Programme 1998-2002

ECBOS

Enhanced coach and bus occupant safety

Objectives

ECBOS aimed at making improvements in current regulations and proposing new regulations and standards for the development of safer buses and coaches by means of:

- developing cost effective test and evaluation methods for the assessment of the protection available to bus occupants and driver in frontal, oblique and rollover accidents;
- optimising restraint devices for occupants which were previously tailored to a standard male occupant;
- specifying child restraint systems for buses and coaches;
- considering different sizes of buses according to ECE regulations used in public transport (i.e. up to 5 tonnes maximum weight, and in excess of 5 tonnes);
- putting special emphasis on city buses, where passengers are often standing;
- drafting new standards aiming to increase the safety of buses; and
- demonstrating the efficiency of those new standards through the use of numerical models on improved bus design.

Main results

One of the key outputs of ECBOS have been detailed proposals for amending ECE regulations and related EC Directives on buses and coaches, in particular for vehicles with more than 5 000 kg of gross weight (categories M2 and M3). In a subsequent step specific suggestions for new bus and coach safety regulations have been made, featuring:

- recommendations on rollover accidents;
- recommendations on frontal/rear impacts;
- recommendations on new draft regulations, such as:
 - research for driver/co-driver frontal impact safety;
 - compatibility between bus/coach and other vehicles;
 - double-deck coaches (superstructure resistance);
 - harmonised accident databases;
 - guidelines for using numerical techniques;
 - development of a rollover dummy is necessary to predict injury criteria;
 - further research on driver's impact on accident avoidance;
 - further research on possibilities for general rating of the passive safety.

Starting date:	01/01/2000
Closing date:	01/06/2003
Total cost:	€ 2 312 999
EC contributions:	€ 1 489 565
Project funded by DG TREN	

17

IMMORTAL

Impaired motorists, methods of roadside testing and assessment for licensing

Objectives

IMMORTAL specifies a research programme concerning the accident risk associated with different forms of driver impairment and the identification of 'tolerance levels' applied to licensing assessment and roadside impairment testing (including drug screening). Thus, IMMORTAL is focused on two societal needs that both contribute to quality of life, namely **mobility** and **safety**.

Main results

IMMORTAL research essentially contributed to the information about drug driving, with regard to the guidelines for driver assessment, the effects on driving performance of various acute and chronic impairments (e.g. diabetes, depression), and the evaluation of methods to assess the effect of certain diseases on fitness to drive.

The **highlights of IMMORTAL** show that:

- Concerning the prevalence of psychoactive drugs, there are indications that the proportion of **drugged drivers** has increased and that mixed consumption has become more frequent. By means of case control studies a more accurate risk assessment was made possible.

- Furthermore, prosecution of DUI is urgently needed in case of alcohol especially for drivers with high BACs, and drivers with combinations of drugs and alcohol and more than one drug.
- Legal framework for both prosecution and further research is important and still has to be established in some cases.
- Concerning **illness and diseases**, it became apparent that the degree of impairment not only differs depending on the medical condition, but also may clearly vary individually. Individual compensation abilities can be crucial factors in the context of assessing the fitness to drive. This result speaks for two things: (1) to measure the identified, especially risky medical conditions and (2) to assess individually to which extent driving fitness exists.
- For the assessment, both medical and psychological variables have turned out to be relevant.
- Regarding the **intervention methods**, frequent Random Breath Testing and Alcolocks are promising measures. A drug recognition method tested in the context of IMMORTAL still needs further improvement, also the saliva test devices seemed yet to be error-prone.
- Concerning licensing procedures, consistent, reliable, and valid standards are sought after. Medical expertise turned out to be an important contact that on one hand should be informed about the specific effects of medicines on driving performance and on the other hand has to relay this information to the patients.



- Concerning criteria for high risk categories, IMMORTAL yielded important starting points: for illegal drugs that are taken alone, and with the exception of heroin, zero-tolerance legislation would, however, seem to result in very high costs and hardly any road safety benefits.
- For most medicinal drugs, like antidepressants, benzodiazepines, codeine, barbiturates and even morphine, therapeutic levels may be adequate as legal limits, at least for the time being.

N.B.: Research on these subjects has been continued by the FP6 project DRUID.

Starting date:	01/01/2002
Closing date:	30/06/2005
Total cost:	€ 3 343 697
EC contributions:	€ 2 512 473
Project funded by DG TREN	

PENDANT

Pan-European Co-ordinated Accident and Injury Database

Background

The prevention of injuries by improved vehicle safety has been a central pillar in the overall casualty reduction strategy. The introduction of the front and side impact directives in 1996 accompanied by the EuroNCAP Consumer information system was based on a systematic analysis of existing accident data that was used as the basis for the development of new test methods, which were in turn the basis of subsequent test procedures. These policy initiatives have been the main driving factor in improving the levels of protection of cars and they demonstrated the value of sufficiently detailed accident data to support test procedure development. Nevertheless the accident data utilised has been gathered within special studies on a national basis and there was no uniform data available to describe the wider European accident population.

Objectives

The PENDANT project was established to develop a new European level of crash-injury data in a consistent manner that had not been done before. The overall objective was to establish a European level data infrastructure, which could be used to gather and analyse accident information at a greater level of detail than previously seen.

The specific objectives of the project were to:

- specify core and add-on data elements covering both active and passive safety;
- create a new approach to estimate casualty reductions applicable to both primary and secondary safety countermeasures;
- define harmonised procedures for assessing injury severity using threat to life measures;
- create a new in-depth crash injury database which, when analysed, will give results that can be used to form generalised conclusions about European crash population (data has been collected in eight countries to a uniform procedure and concerns injured car occupants or pedestrians);

- use hospital based data, linked or not with police and vehicle data, as a source of information on traffic safety;
- carry out analyses of both the in-depth database and hospital based data systems, to give feedback on effectiveness of existing countermeasures and priorities for future safety improvements.

Among these objectives there was also the need to develop harmonised methods to evaluate collision severity in a way that could be implemented in a uniform manner by several investigating teams.

The incorporation of hospital register data and police level data enabled the group to demonstrate to what extent it is possible to analyse in a common way hospital data of road injuries to complement police data information coming from the countries involved, despite all their differences. The objective was to analyse the databases and identify priorities for future European regulatory and other actions.

Main results

The main achievements of the PENDANT project were:

- **Methods to assess collision severity:** a manual giving guidelines for accident reconstruction has been produced to serve as an overview of methods for crash analysts. A major output of this project's activities was the development of the crash test database providing new access to EuroNCAP and other crash test data.
- **Traffic Users Injury Output Scales:** a review of the available injury scales has identified that the Abbreviated Injury Scale is the most appropriate tool to describe the nature of injuries and measure threat to life. It also made recommendations for harmonised application to in-depth injury data and improved relevance to field data.
- **Predictive Methods for Estimating Casualty and Injury Reductions:** crash modelling methods were used to predict the change in crashes and injuries from the use of new technologies, in particular Electronic Stability Control and certain advanced restraint systems.
- **Accident Investigation Infrastructure:** a structure that can be used to investigate accidents in 8 countries has been established using specially trained teams in the UK, France, Germany, The Netherlands, Finland, Austria, Spain, and Sweden.



- **In-depth Accident Database:** the teams have collectively investigated over 1 100 crashes in-depth gathering extensive information about the nature of the collision (the vehicle damage, the performance of the safety systems and the injuries sustained).
- **Accident Data Analysis:** the database has been analysed resulting in a report that reviews the accident situation and gives guidelines regarding future priorities for injury prevention.
- **Linked hospital and police data systems:** existing injury register databases in France, the Netherlands, and Spain have been reviewed for their purpose, as well as the data contents and the methods of linkage. Probabilistic, deterministic and manual methods were used.
- **Analysis of linked accident data:** the data from the three countries, describing the injuries of nearly 100 000 casualties have been analysed to evaluate priorities in injury prevention and to identify issues related to under-reporting of crashes.

Policy implications

As a result of this project there is a coordinated system to inform European vehicle safety policy in a systematic and integrated manner. The results of the data analyses provide new directions to develop injury countermeasures and regulations. The data itself provide an essential tool to contribute to the technical development and assessment of new and recent regulations. The broad international coverage will ensure that new Directives have safety benefits for the whole European population.

Starting date:	01/01/2003
Closing date:	01/12/2005
Total cost:	€ 872 816
EC contributions:	€ 823 505
Project funded by DG TREN	

VC COMPACT

Improvement of vehicle crash compatibility through the development of crash test procedures

Background

Following the introduction of EuroNCAP and the European Frontal and Side Impact Directives, it is widely recognised that improved vehicle crash compatibility offers the next greatest potential benefit for improving car occupant safety.

Objectives

The ultimate aim of the project was to develop crash test procedures, which once implemented in regulatory and/or consumer testing will lead to reduction in the casualties in car to car and car to heavy truck impacts.

The specific objectives are:

For **car-to-car** impacts:

- to develop a set of test procedures with associated performance criteria to assess a car's compatibility in frontal impacts;
- to perform an associated cost benefit analysis.

For **car-to-truck** impacts:

- to develop test procedure(s) with associated performance criteria to assess energy absorbing front underrun protection systems for trucks;
- to provide guidelines for improvement of existing legislation on truck rear underrun protection;
- to perform associated cost benefit analyses.

Main results

The costs and benefits for improved frontal impact car-to-car compatibility for Europe (EU15) were estimated. The casualty benefit that could be realised with improved frontal impact compatibility performance was estimated for the UK and Germany, by TRL and BAST respectively. As a definite set of test procedures to assess a car's compatibility has not yet been defined, the study was undertaken based on the assumptions of how a compatible car would perform. The UK and German benefit estimates were then scaled to give the benefit for the EU15 countries. The cost of improved compatibility was estimated by Fiat, based on the costs required to modify a current car to meet assumed compatibility requirements. Using this information, the cost benefit ratio was calculated for Europe (EU15). The benefit of improved compatibility for EU15 was estimated to be between 721 and 1 332 lives saved and between 5 128 and 15 383 seriously injured casualties mitigated per year.

There are a number of limitations to the benefit estimates, the main one being that the possible benefit for side impacts of improved frontal impact compatibility has not been considered. The cost benefit ratio, defined as value of benefit divided by cost of implementation, was predicted to be between about 4.5 and 0.5. It should be noted that this cost benefit has been calculated for the steady state, when the entire vehicle fleet is compatible. The benefit will be less during the initial years as compatible cars are introduced into the fleet. An additional significant finding was the high frequency of moderate (AIS2) and life threatening (AIS 3+) injuries sustained by car occupants due to seat belt induced loading. The majority of thoracic injury was not prevented by the injury reduction models. There is an argument that a more compatible vehicle would benefit from



an improved crash pulse and therefore it would be expected to see lower seat belt loads and a reduced risk of thoracic injury. The models, by their design, did not prevent injury attributed to seat belt loading, and therefore underestimate the potential benefit that could be seen for this body region. This is important to note, as head and thoracic injury are known to be associated with fatal outcomes.

N.B.: Further research on thoracic injuries have been started in FP7 DG RTD funded projects.

Starting date:	01/04/2000
Closing date:	31/03/2003
Total cost:	€ 2 281 017
EC contributions:	€ 3 000 004
Project funded by DG TREN	

VIRTUAL

Virtual reality systems for perceived ergonomic quality testing of driving task and design

Objectives

VIRTUAL aimed at developing innovative Virtual Environment (VE) systems for vehicle testing where the driver could be able to simulate real driving tasks at a high level of coherence with reality in terms of behaviour and perception.

The main objective of the project was to develop an integrated platform, based on Virtual Reality (VR) technology, including systems for testing and related experimental procedures, to be used for better studying and improving the **ergonomic design of the vehicles**, in the process of making the driving tasks simpler and more comfortable and then of increasing safety.

Main results

The three different VR simulators developed allow the driver to interact with a simulated car and the surrounding environment during the accomplishment of realistic driving tasks. The systems have been validated by comparing performance of subjects in real cars and in a simulated environment and have been evaluated with respect to acceptance and quality.

The systems have been purposely designed in a way to explore different VR technologies and to test their efficiency with respect to the declared goals of the project: ergonomic analysis and training. They are characterised by an increasing level of immersion in the VE and by differences in the kind of devices and in the degree of feedback (haptic, visual, acoustic) they provide to the user.

In order to test the systems, a set of driving tasks was selected which place different loads on ergonomic aspects of the vehicle (e.g., internal and external visibility, operation of the controls). Examples of these tasks are: driving along a country road keeping constant speed, hazard braking manoeuvre, driving along a city street respecting traffic lights, overtaking a car on the motorway, parking between two cars, entering a narrow garage and crossing a busy street. Special care was taken to reproduce the car model which was used for the road trials in VR.

Finally the systems developed in the VIRTUAL project were applied in studies for the training of novice drivers and for the development of ergonomic criteria regarding the visibility.

Starting date:	01/04/2000
Closing date:	31/03/2003
Total cost:	€ 3 975 695
EC contributions:	€ 2 555 954
Project funded by DG TREN	

CHILD

Child injury led design

Background

The analysis of accidents involving children reveals that child restraint systems (CRS) in compliance with European regulations give highly contrasted levels of protection in real-world accidents. The low effectiveness of child restraint systems can partly be explained for the youngest passengers by their greater cervical vulnerability and for the oldest (from 3 to 12 years old) by the morphological immaturity of the pelvis.

The main reasons for this bad situation are on the one hand the lack of bio-fidelity of the dummies, and on the other hand the insufficient biomechanical knowledge on injury mechanisms and associated physical parameters.

Objectives

The main technical objective of CHILD was to propose enhanced standards and testing methods and new methods for virtual child restraint systems development and testing.

The main scientific objectives of the project were to:

- better understand the events in real world crashes and the associated injury outcomes experienced by child occupants, through real world crash investigations and full-scale reconstructions of a selection of these cases;
- observe the usage of child restraint systems in order to detect misuses and assess, through testing, the risk linked to these misuses;
- better evaluate the child kinematics in different types of impacts for different ages of children and for different types of child restraint systems;



- evaluate and assist some further sensor and dummy developments, & contribute to add to early development of child human body models;
- undertake some validation of the dummy and human models through virtual crash reconstructions;
- obtain data necessary to further consolidate or establish child injury criteria and child injury risk curves;
- give the tools to the child restraint manufacturers and particularly SME's to design CRS's offering an optimised level of protection to children in cars;
- feed this CHILd research into other EC projects and thematic networks.

Main results

The CHILd project brought together the expertise and technologies from the field of occupant safety with focus on children.

This work has involved a combination of traditional research methods together with the development of new expertise in areas such as the virtual environment.

Achievements include:

- Real world data collection (669 cases).
- Analysis of CHILd accident db content (non-representative of real world situation).
- Literature review and field studies of CRS use and misuse.
- Effect of misuse – evaluation testing programme in frontal impact.
- Q dummy family update + new born dummy development –Q0; Abdominal sensors (two types + validation sled tests),

Numerical dummy models (Q3,Q0), Human-like neck model (3 year old child).

- Full-scale accident reconstructions and parametric sled tests, numerical accident reconstructions (pc-crash –FEM approach).
- FEM CRS models development.
- First trend for head injury criteria (–frontal).
- Thresholds for injury criteria for neck, chest, abdomen.
- Frontal test procedure.
- Proposal of side impact test procedure.

CHILd project results represented an invaluable source of real world crash injury data, based on real and virtual reconstructions of such cases, child-based simulation methods and tools, and in-depth evaluation of child dummies. The project also provided the manufacturers of restraint systems and airbags with much more accurate information which, in turn, should lead to rapid improvements in the safety of young passengers.

Whilst the outcomes of CHILd are directly ready for use, there is a need for future research activities focused on children, taking the outputs of the CHILd research project as the basis.

N.B.: Further research has been started under DG RTD FP7 funded projects.

Starting date:	01/01/2000
Closing date:	01/07/2003
Total cost:	€ 4 506 640
EC contributions:	€ 2 985 754
Project funded by DG RTD	

21

VITES

Virtual testing for extended vehicle passive safety

Objectives

In this project, the virtual testing process for crash safety applications was defined through: i) procedures and guidelines defined to apply virtual testing as part of regulated passive safety evaluations; ii) stochastic response of crash tests caused by the scatter in the components; iii) range of protection extended to real life crash conditions by identification of gaps in the current regulations where occupants are not being adequately protected. Based on an extensive analysis of the effects of impact conditions and occupant characteristics, procedures have been defined to fill these gaps by virtual testing.

Main results

- A general procedure for objective rating of comparisons between numerical and experimental results (including software).
- General modelling and validation procedures for numerical dummy models, human models, restraint system models, barrier and vehicle models.

- Evaluation of machine and software dependencies.
- General modelling guidelines for impact simulations. Assessment of accuracy and reliability that can be obtained by virtual testing and of possible reductions in hardware testing and design costs.
- An overall injury risk assessment method for a range of impact conditions and injury criteria (including software).
- Indication of areas where the current regulations are not optimally protecting car occupants.
- Assessment of the potential of real human models for passive safety design.
- A validated virtual test procedure extending the range of protection beyond current regulations to real life crash conditions.
- A demonstrator virtual test procedure including all the steps needed for acceptance of virtual testing in regulations or in a consumer test method.

Starting date:	01/02/2001
Closing date:	31/01/2004
Total cost:	€ 3 150 992
EC contributions:	€ 1 851 763
Project funded by DG RTD	



E-MERGE

Pan-European harmonisation of vehicle eMERGENCY call service chain

Objectives

The overall objective is to ensure the availability and functioning of vehicle based emergency call systems from any vehicle anywhere in Europe via the development of a X-112 call. The key objective of E-MERGE was therefore to develop, test and validate common specifications for the vehicle emergency call at all levels along the vehicle emergency call chain and to ensure the availability of the technical, organisational and business structure for a European wide take-up of the solution. Other main objectives were to remove cross-border and language problems and to make an interoperable solution covering the whole of Europe and including all European vehicle manufactures, which after the project will be adopted by the involved vehicle manufactures, E-Call service centres, PSAPs and emergency agencies.

Main results

The project identified needs and requirements of all actors in the emergency call chain - drivers, vehicle and equipment

manufacturers, service centres, PSAPs and emergency agencies (e.g. police, fire, and ambulance). It established the required technical and organisational framework as well as suggested business and commercial solutions to the establishment of pan-European vehicle E-Call services and systems including the creation of X-112 and pan-European service roaming between E-Call Service Centres. Specifications were defined for technical elements, including message content and formats, exchange protocols, databases and a Europe-wide harmonised vehicle E-Call system based on adaptation of existing technology and systems was suggested. The system interoperability has been tested in vehicles from five European vehicle manufactures (with a sixth as an observer) in different scenarios and locations across five European trial sites. These involved local E-Call service centres, PSAPs and emergency agencies. Finally scenarios for European E-Call service chain deployment and for the adoption of the agreed business solution across Europe have been assessed.

Starting date:	01/04/2002
Closing date:	31/03/2004
Total cost:	€ 4 260 000
EC contributions:	€ 2 040 000
Project funded by DG INFSO	

22

SAVE TUNNEL

Innovative systems and frameworks for enhancing of traffic safety in road tunnels

Objectives

SAFE TUNNEL's main objective was to contribute to the reduction of the overall number of accidents inside road tunnels through preventive safety measures. Research contributed to increase knowledge of vehicle status in order to forbid tunnel access to those vehicles with detected or imminent on-board anomalies and to introduce measures to control of the speed of the vehicles. To fulfil these ideas, SAFE TUNNEL aimed to integrate on-board vehicle devices and the relevant infrastructures at three levels: check of on-board devices to detect/predict anomalies and the relevant information transmission to the control centre; control of the access inside tunnel and management of the communication vehicle-infrastructure; control of the speed inside tunnel by vehicle telecontrol; and a moving spot light system.

Main results

Development of two demonstrator trucks equipped with preventive diagnosis devices, tele-control and HMI facilities; Development of the control centre to manage SAFE TUNNEL applications; Analysis of the needs of tunnel operator for managing safety related operations with electronic devices; Analysis of driver requirements for an effective on-board Human Machine Interface; Transmission of data in the Frejus area (tunnel included) by a public telecom network (GSM/UMTS)- Demonstrations of SAFE TUNNEL concept by field tests at Frejus Tunnel; Evaluation activities included: Technical and Impact analysis, User acceptance evaluation, Socio-economic impact estimation and Cost Benefit analysis; Recommendations for Standardisation bodies.

Starting date:	01/08/2001
Closing date:	31/07/2004
Total cost:	€ 4 940 000
EC contributions:	€ 2 220 000
Project funded by DG INFSO	

SAVE-U

Sensor and system Architecture for vulnerable road user's protection

Objectives

The main objective of SAVE-U was to develop an integrated system for the active protection of UPR (unprotected road users) such as pedestrians and cyclists. The project dealt with three different stages:

- detection of the UPR at sufficient distance (up to 30 meters in an urban environment) covering the largest range of scenarios;



- definition and implementation of driver warning and vehicle control strategies in order to avoid a crash;
- definition of strategies for active protection of UPR in case the crash cannot be avoided.

During the first part of the project, the novel sensor platform had to be optimised for the detection of unprotected road users by means of low- and high-level sensor fusion in order to reliably operate in most of the scenarios and to fulfil the strong requirements of an active safety system. The second part of the project dealt with the development and implementation of the algorithms for data fusion, the integration of the entire sensor platform, the equipment of experimental cars as well as with the evaluation of the developments including the integrated system approach.

Main results

Based on the analysis of relevant situations with UPRs in urban environments (a database will be recorded in various

European cities), SAVE-U defined suitable protection system concepts based on the analysis of the reflectivity of the dressed human body for the sensing technologies considered here as well as on the basis of the advanced concepts for actuators to protect passengers and the know-how in terms of collision avoidance functions.

At the end of the project, two experimental cars were equipped with prototypes of the innovative sensor platform and with the novel driver warning and vehicle control strategies. Performances evaluation demonstrated the effective impact of the overall system on UPR safety in most of the traffic scenarios.

Starting date:	01/03/2002
Closing date:	30/09/2005
Total cost:	€ 8 015 235
EC contributions:	€ 4 007 616
Project funded by DG INFSO	

The Sixth Framework Programme 2002-2006

DRUID

Driving under influence, drugs, alcohol and medicines

Background

One of the major causes of road accidents is impaired driving due to the consumption of psychoactive substances such as alcohol, drugs and certain medicines. While significant progress has been made in driver education and training, our knowledge about the effects of psychoactive substances on road safety is limited. Most efforts have concentrated on drink-driving, and although this remains a problem which requires further efforts, substantial progress has been made in reducing drink-driving in the EU in recent years.

On the other hand, knowledge of the issue of drugs and medicines is limited. Societal changes have led to driving impairment due to drugs and medicines being as widespread as drink-driving, for example with the increase in illegal drug use among younger people in particular, as well as an aging society with increasing need for medicines which, while legal, can often affect driving aptitude.

Objectives

The objective of DRUID is to give scientific support to EU Transport Policy to reach road safety targets by establishing guidelines and measures to combat impaired driving.

The project aims to provide the following:

- reference studies on the impact on fitness to drive for alcohol, illicit drugs and medicines, giving information on the real

- degree of impairment caused by each substance and their actual impact on road safety;
- recommendations for the definition of analytical and risk thresholds;
- analysis of the prevalence of alcohol and other psychoactive substances in accidents and in general driving, including setting up a database;
- evaluation of good practice for detection and training measures for road traffic police allowing legal monitoring of drivers;
- a classification system of medicines affecting driving ability, recommendations for its implementation and a framework to position medicines according to a labelling system;
- evaluation of the efficiency of prevention, penalisation and rehabilitation strategies, considering the difficulties of appropriate evaluation strategies for combined substance use; recommendations on good practice;
- a definition of strategies for driving bans, combining road safety objectives with mobility needs;
- a definition of the responsibility of health care professionals for patients consuming psychoactive substances and their impact on road safety, including drawing up of guidelines and making information available and applicable for all European countries.

Starting date:	15/10/2006
Closing date:	14/10/2010
Total cost:	€ 23 810 000
EC contributions:	€ 23 810 000
Project funded by DG TREN	



RIPCORDER-ISEREST

Road Infrastructure Safety Protection

Background

Road infrastructure related safety measures offer a large potential that could be exploited in view of a significant reduction of road accidents and their consequences. Considering that most casualties occur on single carriageway rural roads, RIPCORDER-ISEREST focused on road infrastructure measures for this type of road.

Objectives

The fundamental objective of RIPCORDER-ISEREST was to develop best practice guidelines based upon the current research results for:

- Road Safety Impact Assessment tools and Accident Prediction Models.
- Road Design and Road Environment.
- Road Safety Audit.
- Road Safety Inspection.
- Black Spot Management and Safety Analysis of Road Networks.

With these tools, RIPCORDER-ISEREST intended to give scientific support to practitioners concerned with road design and traffic safety in Europe.

Furthermore, regarding safety interventions, secondary roads have so far had much less attention than primary roads and motorways, even though a large proportion of fatalities in rural areas occur on secondary roads. Still, design guidelines for these types of roads rarely existed within Europe. As a result, a great number of these roads are in a state which is inappropriate to modern road traffic. To fill this gap, RIPCORDER-ISEREST developed a Safety Handbook for Secondary Roads.

Main results

RIPCORDER-ISEREST gave scientific support to the European transport policy road-safety target of 2010 by establishing two fundamental achievements:

- best practice tools and guidelines for road infrastructure safety measures concerning accident prediction models, road-safety inspections, and black-spot management;
- tools for cost-efficiency assessment of different safety measures in order to develop and manage a safe road infrastructure in a cost-effective way.

The project reached these 2 results in a harmonised way, building a 'common practice' approach for accident prediction models, road-safety audits, road safety inspections and black-spot management.

Considering that half of all road traffic fatalities and injuries in rural areas in Europe occur on secondary roads, the project developed specific software tools and a handbook for local road authorities.

Key technical outputs were:

- an in-depth survey of the Accident Prediction Models (APM) and Road-Safety Impact Assessment literature;
- a focus on the concept of 'Self-explaining roads', a road designed and built in such a way as to induce adequate behaviour on behalf of the motorist;
- the project developed SEROES, a freely accessible database for road-authorities responsible for secondary roads, containing the 'Best Practice Safety Information System', a summary of information regarding road-safety improvements;
- a GIS Decision Support Tool was developed to assist local and regional road authorities to determine road safety problems, select appropriate safety intervention measures, and provides the opportunity to predict the road safety level of a municipality/region and the cost-effectiveness of road safety projects.

Starting date:	01/01/2005
Closing date:	31/12/2007
Total cost:	€ 3 420 000
EC contributions:	€ 2 600 000
Project funded by DG TREN	

SAFETY NET

Objectives

The EU target of a 50% reduction in fatalities by 2010 will only be achieved by the introduction of the most effective counter-measures. It relies on the existence of basic knowledge of crashes and their causation and the availability of road safety data to monitor and assess performance. The EC has expressed the demand for a 'Road Safety Observatory' in its 2002 White Paper and other public documents.

Main results

SafetyNet contributed to lay down the first bricks of the Road Safety Observatory, which will enable the Commission to monitor progress towards targets, identify best practise, and ensure that new regulatory and other safety actions will

result in the maximum casualty reduction. All data assembled or gathered within the project are available over the web to the entire road safety community.

The main work areas were:

- further enhancement and exploitation of CARE including extension to the 10 new member states including the CAREPLUS 10;
- a new methodology to gather risk/exposure data and integrate it to datasets incorporating the CAREXPO project;
- the design and implementation of a Europe-wide network for periodical measurements of safety performance indicators;
- recommendations for independent road accident investigation;
- a new fatal accident database at intermediate level and an in-depth accident causation database;



- provision of a Safety Information System as a gateway for the complete set of information gathered;
- validation and analysis of the data potentially the project will revolutionise EU approaches to road safety by the provision of a new extensive.

Starting date:	01/12/2004
Closing date:	01/12/2008
Total cost:	€ 19 470 000
EC contributions:	€ 9 000 000
Project funded by DG TREN	

APROSYS

Advanced protection systems

Objectives

The main objective was to improve passive safety for all European road users in all relevant accident types and accident severities. The secondary objective was to increase the level of competitiveness of the European industry.

The Integrated Project (IP) on Advanced Protective Systems (APROSYS) focused on scientific and technology development in the field of passive safety (crash safety). The field of passive safety concerns in particular human biomechanics (injury mechanisms and criteria), vehicle and infrastructure crash-worthiness and occupant and road user protection systems. The general objective of APROSYS was the development and introduction of critical technologies that improve passive safety for all European road users in all relevant accident types and accident severities.

Main results

- new injury criteria and injury tolerance;
- new mathematical models of the human body (crash & pre-crash phase, arbitrary body sizes);
- new world-wide harmonised crash dummy for representation of a small female car occupant (side impact);
- knowledge and tools enabling the design, implementation and evaluation of intelligent safety systems;
- virtual testing technology for design and evaluation of crash protection methods;
- advanced protection systems for injury reduction of pedestrians and pedal cyclists (front impact, primary & second impact);
- advanced protection systems including compatibility strategies for injury reduction of car occupants (front & side impacts);
- advanced protection systems for injury reduction in most relevant accident types involving heavy trucks;
- advanced protection systems for reduction (number and severity) of injuries to motorcyclists.

Starting date:	01/01/2004
Closing date:	01/12/2009
Total cost:	€ 30 230 000
EC contributions:	€ 18 000 000
Project funded by DG RTD	

25

PISA

Powered Two-wheeler Integrated Safety

Background

Motorcycle or moped travel carries a risk of death per kilometre travelled that is 20 times higher than that for car travel. PTW accidents now represent a major subject for road safety in Europe. The safety of vulnerable road users, including motorcycle and moped riders, is one of the priorities of the European Community. Developing countries have a much lower level of motorisation and the road usage pattern is significantly different from those of developed ones. The proportion of PTWs in these countries is extremely high and the traffic usage patterns are very complex. In India, for instance, PTWs account for about 80% of the domestic automotive sales. This means that these countries are exposed to a much higher level of road accident risk.

Objectives

The objective for the PISa project is to combine sensors and actuators to:

- avoid 50% of accidents where a collision was not inevitable;
- reduce the impact speed, and hence reduce the injury severity by one MAIS integer for 50% of accidents where a collision was unavoidable;
- prevent 50% of the single vehicle loss-of-control accidents.

Expected Outcomes

PISa will produce 36 deliverables. Of these the most important are:

- a report summarising the accident scenarios and causations in which integrated safety systems are considered likely to make a positive contribution from the statistical accident data;
- estimate of the impact of integrated safety devices on the fatalities/injuries;
- integrated system – sensors (including a configuration suitable for the motorcycle state observer), logic control, warning devices, intelligent brake and suspension component for motorcycle(s);
- evaluation of collision mitigation and avoidance strategies;
- prototypes of the selected safety devices and laboratory test results;
- a motorcycle fitted with a second phase prototype system(s) that can be used to demonstrate the performance and benefit.



A high percentage of reduction of motorcycle fatalities is expected for PISa based on the integrated approach, i.e. avoidance in 50% of accidents where a collision was not inevitable, reduction in impact speed and preventing 50% of the single vehicle loss-of-control accidents.

Starting date:	01/06/2006
Closing date:	30/11/2009
Total cost:	€ 2 943 730
EC contributions:	€ 1 850 000
Project funded by DG RTD	

TRAIN ALL

Integrated System for driver TRaining and Assessment using Interactive education tools and New training curricula for ALL modes of road transport

Background

Over 80% of all traffic accidents can be directly attributed to the human factor so emphasis must be given to driver operator training. Traffic participants range from car and motorcycle to truck drivers and all need to be trained in a specific way. Indicatively:

- novice drivers of passenger cars have no possibility of enhancing risk awareness and need training in other higher order skills;
- motorcycle drivers have no experience on using safety equipment and low experience on driving different types of motorcycles;
- heavy vehicle drivers get most of their experience on the road and are often involved in specific accident types;
- drivers of emergency vehicles only get a few possibilities to practise on the complexities of interaction with other traffic participants.

There is a pan-European consensus on the fact that driver training needs to expand away from its current focus on controlling the vehicle in traffic, so as to cover 'higher level' strategic factors. TRAIN-ALL will improve initial and continuous driving training in order to stimulate road users towards a more responsible behaviour.

Objectives

The main objectives are to:

- prioritise a set of training scenarios for each driver type;
- develop a common and concise ontological framework for computer-based training (CBT) tools, functionalities and scenarios;

- develop a cost-efficient and valid methodology to assess simulator reliability and fidelity;
- employ intelligent agent technology in order to develop CBT with Aml-based traffic participants;
- develop cooperative training scheme and co-driver training (for emergency vehicle co-pilots) scenarios and tools;
- develop the appropriate P2P tools to allow CBT networking and even real-time collaboration;
- develop a virtual instructor module that will allow autonomous and cost-effective multi-user training by CBT;
- develop and test the method of adaptive training;
- develop appropriate training schemes and scenarios for CBT in the use of new driver assistance and information systems;
- use an existing motorcycle simulator and adapt it accordingly;
- develop cost-effective, high fidelity, low dizziness and modular driving simulator tools for passenger cars and trucks, and a virtual driving simulator for passenger cars;
- develop new, improved training and assessment curricula for drivers;
- evaluate the viability, usability and usefulness of the developed tools and curricula in ten pilots;
- estimate the potential road safety enhancement due to the developed tools and curricula;
- produce detailed exploitation and business plans for the developed tools.

Expected Outcomes

TRAIN-ALL will develop a computer-based training system for the training and assessment of different land-based driver cohorts (motorcycle riders, novices, emergency drivers and truck drivers) that integrates multimedia software, driving simulator, virtual driving simulator and onboard vehicle sensors into a single modular platform.

Starting date:	01/11/2006
Closing date:	31/10/2009
Total cost:	€ 3 702 408
EC contributions:	€ 2 300 000
Project funded by DG RTD	

INTRO

Intelligent roads

Background

European countries are experiencing ever-increasing maintenance costs to keep the road network in a good and safe condition. The reasons for this are increased traffic volume

combined with accelerated damage to pavements due to increased gross weights and evolution of load configurations of heavy goods vehicles. With the demand for increased freight transport increasing substantially, this situation will get worse instead of better unless new approaches can be found to increase the capacity and improve the maintenance through added intelligence to existing roads rather than building new roads.



Objectives

The INTRO project focused on the following main objectives:

- applying and combining existing and new sensor technologies in a holistic way in order to increase capacity and safety significantly, as well as improving the well-being of road users;
- make combined use of real-time network technologies, road databases and sensor technologies in order to create timely and localised information of the infrastructure, improving both road safety and capacity;
- aggregate and visualise information in order to optimise the road user's needs as well those of the road operator and road authorities.

A large amount of sensor/data input is already available: road surface databases, *in situ* sensors in road pavements and bridges (WIM, strain gauges, optical-fibre technologies, etc) as well as an increased number of in-vehicle sensors developed by the car industry.

Main results

Exploitable product(s) or measure(s):

- guidelines and recommendations for ITS deployment use in future standards;
- implemented data model combining static and dynamic skid warnings;
- new use of in situ sensors and probe cars;
- new methods for data fusion and travel time estimations.

Targeted users:

- road authorities;
- ITS service providers;
- traffic management centres.

Starting date:	01/03/2005
Closing date:	29/02/2008
Total cost:	€ 3 496 456
EC contributions:	€ 1 999 020
Project funded by DG RTD	

NR2C

New Road Construction Concept

Objectives

Surface transport infrastructures in European countries represent a tremendous heritage. Their adaptation to new societal demands is a major objective. The development of new technical innovations is slow, due to the multiplicity of road owners, the lack of design guidelines and cost/benefit ratio information. Furthermore innovations have not been integrated into a global vision of the road of the future.

NR2C aimed at addressing these issues by:

- expressing and deriving new concepts for the roads of the future, from a global perspective;
- developing a number of targeted innovations of special interest.

Some concepts have been analysed and ranked through a multi-criteria analysis that included large-scale socio-economic considerations within the scope of sustainable development. The selected concepts have then been further developed in order to prove their technical and economic feasibility, clarify unsolved problems, propose specific innovations for problem resolution, and lay out a path towards their progressive implementation.

Main results

NR2C has developed long-term perspectives, concrete pilot projects and research recommendations, linking long-term visions and ideas to short-term actions. 'Dialogue and cooperation', 'Creativity and innovation' and 'Short- and long-term' are the main ingredients of this project.

Some specific innovations developed in NR2C are classified in accordance to their contribution to one of the four NR2C concepts – human, reliable, green, safe and smart infrastructure – previously identified. Of course innovative solutions developed, generally do not answer to only one unique concept, but simultaneously to two or more of them.

This report has chosen to link each innovation to the dominant concept addressed:

- **towards more human infrastructure:** new design-models for arrangement and development of multi-modal streets, that can be used as a tool for dialogue and co-design between actors;
- **towards greener infrastructure:** Eco-Road System – an integrated road concept – combining new technologies for the reduction of traffic nuisance (noise, air and water pollution), with in addition a special focus of TiO₂ as air purifier;
- **towards more reliable infrastructure:** as regard roads, new maintenance road processes allowing to perform maintenance works even under bad weather conditions and consequently to reduce traffic congestion by extending possible maintenance seasons; as regard bridges, several solutions of innovative small and medium span bridges, light, durable, easy to prefabricate and assemble on site;
- **towards safer and smarter infrastructure:** the use of infrared technology to improve drivers' vision under bad weather conditions; in complex urban environments, the improvement of road safety through urban design. The previous approach to road maintenance is also of high importance in enhancing overall road safety.

Starting date:	01/12/2003
Closing date:	30/11/2007
Total cost:	€ 4 773 992
EC contributions:	€ 2 000 000
Project funded by DG RTD	



CVIS

Cooperative vehicle-infrastructure systems

Background

Cooperative systems in transport can bring new intelligence for vehicles, roadside systems, operators and individuals, by creating a universally understood communications 'language' allowing vehicles and infrastructure to share information and cooperate in an unlimited range of new applications and services. Expected benefits include increased road network capacity, reduced congestion and pollution, shorter journey times, extended and more accurate traffic information, improved traffic safety, lower vehicle operating costs, more efficient logistics, etc.

Objectives

The CVIS Integrated Project will develop and integrate the essential basic and enabling technologies such as a multi-channel communications and network platform readily adaptable for both vehicle and roadside, a highly accurate positioning and local map module, and an open software environment for applications. Combined into a 'CVIS platform'

unit, these components will allow a vehicle to share urgent information with nearby vehicles, and to dialogue with both the immediate roadside infrastructure and with infrastructure operators and service providers. New tools for 'cooperative monitoring' will both deliver real-time traffic information over the entire road network, and augment the information available to local control functions such as intersection controllers.

The CVIS project will develop, demonstrate and assess at test sites in 6 countries, selected reference applications of cooperative systems in the urban and inter-urban environments, and for freight and fleet and public transport management. The results will be a library of basic service components and functions, for in-vehicle and roadside implementation, to be used for shaping cooperation in a flexible way. Both core technologies and generic application services will use open standards for maximum interoperability and ready take-up into products attractive for the individual, profitable for the manufacturer and effective for the infrastructure operator.

Starting date:	01/03/2006
Closing date:	31/01/2010
Total cost:	€ 41 170 000
EC contributions:	€ 21 910 000
Project funded by DG INFSO	

HUMANIST

HUMAN centred design for Information Society Technologies

Objectives

Road telematics and driver assistance systems can constitute a real opportunity to support mobility and to improve road safety. Nevertheless, it is necessary to conceive them according to users' needs and requirements, in order to ensure their acceptability and to detect potential harmful effects of their widespread use. Human factors and cognitive engineering competencies exist in Europe but are scattered. For addressing this fragmentation of research capacities, HUMANIST gathered the most relevant European research institutes involved in Road Safety and Transport to contribute to the eSafety initiative and to improve road safety by promoting human centred design for IVIS and ADAS.

This integration allowed increasing Societal Benefits of ITS implementation, to harmonise ITS approaches among State Members, to react quickly to any new technological developments and to face international challenges by producing state of the art research, identifying knowledge gaps and avoiding redundancy of research activities. The goal of HUMANIST was to create a European Virtual Centre of Excellence on HUMAN centred design for Information Society

Technologies applied to Road Transport (IVIS and ADAS), with a coherent joint programme of activities, gathering research, integrating and spreading activities.

Main results

The knowledge gathered and produced by the HUMANIST Consortium will contribute to the eSafety initiative, which is a joint industry-public sector initiative for improving road safety by using new information and Communication technologies. Human-Machine Interaction was identified as a priority area for the implementation of the eSafety WG Recommendations to support the development, deployment and use of intelligent integrated road safety systems. HUMANIST will bring input to the HMI Working Group in order to develop further recommendations.

Dissemination activities allow to spread widely the knowledge from HUMANIST, by organising debates with RTD projects on eSafety and relevant stakeholders, by promoting harmonisation with standardisation and pre-normative bodies, by setting up training programmes and by promoting and disseminating research results to a wide audience.

Starting date:	01/03/2004
Closing date:	29/02/2008
Total cost:	€ 5 360 000
EC contributions:	€ 5 360 000
Project funded by DG INFSO	



PREVENT

Preventive and active safety applications contribute to the road safety goals on European roads

Objectives

In order to reach the transport policy goals for road safety set by the European Commission for 2010 research should focus not only on the crash phase and the post-crash phase, but also on the pre-crash phase, taking passive, active and preventive safety measures into account.

PREVENT, as part of the EUCAR Integrated Safety cluster, took into account the recommendations of the Commission Communication 'Information and Communications Technologies for Safe and Intelligent Vehicles'.

Main results

The project supported the Commission actions aiming to promote the development, deployment and use of Intelligent

Integrated Safety Systems in Europe. PREVENT has contributed to help drivers to avoid accidents: depending on the significance and timing of the danger, the systems will alert the drivers as early as possible, warn them and, if they do not react, actively assist or ultimately intervene.

In PREVENT, a number of subprojects were carried out within the clearly complementary function fields: safe speed and safe following, lateral support and driver monitoring, intersection safety and vulnerable road users and collision mitigation. Additional cross-functional fields have been prioritised regarding the common understanding of functional architectures, validation and impact evaluation principles, sensor data fusion, map related matters and liability issues as well as cohesion of strategies paving the way for early market introduction.

Starting date:	01/02/2004
Closing date:	31/03/2008
Total cost:	€ 54 170 000
EC contributions:	€ 29 800 000
Project funded by DG INFSO	

SAFESPOT

Cooperative systems for road safety 'Smart Vehicles on Smart Roads'

Objectives

The key to avoiding road accidents is to extend drivers' time/space horizon in their perception of safety-relevant information, and to improve the precision, reliability and quality of this information. The extent of 'perception' of autonomous vehicle-based systems cannot obviously go beyond the operative range of the sensors. Although effective real time awareness of the vehicle's 'surrounding environment' can be achieved, this clearly has limits. Extended coverage is possible only through collaboration between the infrastructure's and the vehicles' sensing abilities. By combining data from roadside sensors and data made available by vehicles in the vicinity, advance knowledge can be gained of potential safety risks, e.g. an icy patch, fog bank, obstacle or accident on the road ahead (but out of sight). The communication of warnings and advice to approaching vehicles (both directly to onboard units and via roadside signals) will provide the extra reaction time necessary to prevent an accident occurring.

Expected Outcomes

One of the main aims of SAFESPOT is to develop a 'Safety Margin Assistant' which will extend 'in space and time' the safety information available to drivers by:

- using both the infrastructure and vehicles as sources (and destinations) of safety-related information, and definition of an open, flexible and modular communications architecture;
- developing the key enabling technologies: accurate relative localisation, ad-hoc dynamic networking, dynamic local traffic maps;
- developing a new generation of infrastructure-based sensing techniques;
- testing scenario-based applications to evaluate the impacts and end-user acceptability;
- defining the practical implementation of such systems, especially in the interim period when not all vehicles will be equipped;
- evaluating the liability aspects, regulations and standardisation issues which can affect implementation: involvement of public authorities from the early stages will be a key factor for future deployment.

Starting date:	01/02/2006
Closing date:	31/01/2010
Total cost:	€ 37 630 000
EC contributions:	€ 20 590 000
Project funded by DG INFSO	



WATCH-OVER

Vehicle-to-vulnerable road user cooperative communication and sensing technologies to improve transport safety

Objectives

The WATCH-OVER project addressed the number of accidents involving road vulnerable users such as pedestrians, cyclists and motorcyclists.

The main objectives of WATCH-OVER were to:

- identify specific road scenarios;
- select and to adapt the most suitable communication and sensing technologies for them;
- integrate above technologies in the demonstrator;
- technically validate in terms of user acceptance the system on the test bed.

Main results

The project carried out RandD activities with the scope to design and develop a cooperative system for the prevention of accidents involving vulnerable road users in urban and

extra-urban areas. The system concept is based on interaction between an in-vehicle module and users devices. It foresees the development of a cooperative system integrating low cost communication technologies, as an extension to autonomous sensor based systems, in combination, if feasible, with localisation technologies, in order to increase the performances needed to cover the most critical situations.

Main innovation aspects are represented by:

- the selection, the HW/SW adaptation and the integration of short range communication and sensing technologies for the detection and positioning of vulnerable road user relatively to the vehicle;
- the development of algorithms for the localisation of the vulnerable road users module and for properly warning the driver about possible dangers;
- the development of a low cost and high efficiency cooperative system.

Starting date:	01/01/2006
Closing date:	31/12/2008
Total cost:	€ 5 910 000
EC contributions:	€ 3 320 000
Project funded by DG INFSO	

The Seventh Framework Programme 2007-2013

DaCoTa

Road safety data collection, Transfer and analysis

Objectives

The project will cover subjects such as: accident data from macroscopic level to in-depth analysis; road safety measure evaluation and policy benchmarking; data on users' behaviour and attitudes; and further integration of various categories of analyses with the aim of:

- transforming knowledge into policy through the European pooling of accident data;
- bringing European methods for accident data collection, transfer and analysis developed and tested within FP5 & FP6 to a more mature level;
- preparing the path for routine activities.

Expected Outcomes

- contribution to the best possible level of road safety, beyond the common objective proposed by the commission in 2001, following targets already set by some Member States;
- development of capacities to explore potential road safety improvements that will not have been exploited by the ongoing actions within the Third European road safety Action programme and within the Fifth and Sixth Framework Programme;
- development of new mechanisms for exploiting existing data sources in standardised ways to facilitate analyses and comparison with other traffic crash related databases;
- definition of a strategic framework for the selection of pan European priorities for in depth data collection.

Starting date:	01/05/2009
Closing date:	31/10/2011
Total cost:	€ 7 306 481
EC contributions:	€ 5 500 000
Project funded by DG TREN	



ASSET Road

ASSET Advanced Safety and Driver Support in Essential Road Transport

Objectives

The main ideas in ASSET are centred on the development, testing and implementation of a holistic approach to improve safety and efficiency in road transport by integrating four entities:

- Driver and operator.
- Vehicle and traffic.
- Infrastructure and environment.
- Regulation and control.

The holistic approach will be at system and practical level. Integrated architectures will be developed to facilitate the exchange of secure information between road, vehicle and driver. There will be a particular focus on the Human Machine Interface – developing supporting systems which pass on safety-critical information to the driver. Driver monitoring technologies such as 'track and trace' will use computer vision to identify abnormal driver behaviour (speed, gap, load) and inform driver and authorities.

A number of technologies will be developed and integrated into the holistic system like a thermal imaging tool to detect dangerous heavy goods vehicles, a new weigh-in-motion sensor which can detect critical tyres as well as overloaded. The main theme is the integration of different information from different sources into a comprehensive system and the communication of the relevant information to where they are needed.

Several application areas will be developed with concrete deliverables such as a safety station, crisis and dangerous goods management and an infrastructure life cycle optimisation system. Systems will be tested at a number of sites in different parts of Europe and results disseminated through seminars, workshops and demonstrations.

Road safety is the key element of the ASSET project. The highest priority is put on accident prevention by improved driver awareness and early warning procedures in case of incidents and hazards. Cleaner traffic will be a by-product of enhanced safety and more fluent traffic flow.

Expected Outcome

The project will develop a holistic system approach towards sustainable road transport (safety, security and environment included). The emphasis is on traffic safety. Security and environmental impacts are by-products of enhanced safety through less turbulent traffic flow and travel based on traffic regulations such as observing posted speed limits and avoiding over-weight trucks. For infrastructure security (wear and related factors) enhanced dynamic and accurate vehicle weight measuring including lateral position and lane use indicators make real-time wear monitoring and the creation of prediction models much easier than has been the case until now.

Positive safety impacts are to be expected through better understanding of the interactions of various transport safety system elements.

Starting date:	01/07/2008
Closing date:	31/12/2011
Total cost:	€ 6 649 260
EC contributions:	€ 6 149 926
Project funded by DG RTD	

PROLOGUE

Promoting real life Observations for Gaining Understanding of road behaviour in Europe

Objectives

The number of road fatalities in Member States is decreasing too slowly to meet the EU-targets. A new generation of measures is needed, underpinned by a new generation of research methods. Recent technology developments allow for this: naturalistic observations. This means that road user behaviour is observed unobtrusively in a natural setting for a longer period of time. This technique allows for analysing the inter-relationship between road user, vehicle, road and other traffic in normal situations, in conflict situations and in actual collisions.

Results will lead to a better understanding of road safety and help to realise an intrinsically safe road transport system, including in-car technology, self-explaining roads, driver training, etc.

The main objective of PROLOGUE is to prove the feasibility and usefulness of a large-scale European naturalistic observation study. The project aims at road safety researchers and other stakeholders including car industry, insurance companies, driver training and certification organisations, road authorities, and governments. Whereas road safety is the main motive, the project will also look at the relevance for environmental issues, e.g. CO₂ emissions and traffic management.

Expected Outcomes

Based on inventory studies, a series of small-scale field trials and close involvement of user groups and stakeholders, PROLOGUE will result in recommendations and an outline for a large-scale



naturalistic study, dealing with research questions, methodology and technology for data collection, data storage, data reduction, data mining and data analysis. Communication and dissemination to all potential stakeholders are vital to gain their support for and involvement in a large-scale European study.

Starting date:	01/08/2009
Closing date:	31/07/2011
Total cost:	€ 2 722 005
EC contributions:	€ 2 000 000
Project funded by DG RTD	

Smart rrs

Innovative concepts for smart road restraint systems to provide greater safety for vulnerable road users

Objectives

According to present trends by 2020 road traffic injuries will be the third leading contributor to the global burden of disease and injury. Many injuries and deaths are a result of impacts with current road restraint systems especially in the case of vulnerable road users such as motorcyclists, cyclists and passengers where impacts with supports or edges usually result in amputations or sectioning of torsos in a guillotine effect. Furthermore once an accident has occurred, the time between the impact and receiving immediate initial first aid can be crucial; delays in alerting emergency services or incorrect location information given to emergency can cause waste life saving moments for injured people or even result in emergency services going to the wrong location of the accident.

The specific objectives of the SMART RRS project are:

- provision of a safe road restraint system free of cutting or dangerous profiles/fixing posts;

- development of this new road restraint system using new materials and fixations to absorb crash energy in accidents detaining moving objects, vehicles and persons safely;
- provision of timely and useful information to road users that will assist in preventing road incidents (Primary safety);
- provision of timely and useful information to emergency services, road authorities and other road users.

Expected Outcome

This smart restraint system shall:

- reduce the number of accidents through better information on the actual state of the road and traffic flow (climatic conditions, traffic flow, obstructions);
- eliminate dangerous profiles from road restraint systems (crash barriers) that currently endanger vulnerable road users;
- optimise road safety by providing exact information of where and when accidents happen in real-time.

Starting date:	03/11/2008
Closing date:	31/10/2011
Total cost:	€ 3 420 000
EC contributions:	€ 2 193 000
Project funded by DG RTD	

32

INTERSAFE-2

Cooperative Intersection Safety

Objectives

Today most so called 'black spots' have been eliminated from the road networks. However, intersections can still be regarded as black spots. Depending on the region and country, 30-60% of all injury accidents and up to one third of the fatalities occur at intersections. This is due mainly to the fact that accident scenarios at intersections are among the most complex ones, since different categories of road user interact in these limited areas with crossing trajectories.

The INTERSAFE-2 project aims to develop and demonstrate a Cooperative Intersection Safety System (CISS) that is able to significantly reduce injury and fatal accidents at intersections.

The novel CISS combines warning and intervention functions demonstrated on three vehicles: two passenger cars and one heavy goods vehicle. Furthermore, a simulator is used for

additional R&D. These functions are based on novel cooperative scenario interpretation and risk assessment algorithms.

Expected Outcome

The deployment of the INTERSAFE-2 system could provide a positive safety impact of 80% with respect to injuries and fatal accidents at intersections. Thus a total safety benefit of up to 40% of all injury accidents and up to 20% of all fatalities in Europe is possible.

The utilisation of V2X communication for CISS at a small number of equipped intersections would boost the overall market penetration of communication in vehicles, since the benefit for those who buy first could be experienced at every equipped intersection.

Starting date:	01/01/2008
Closing date:	31/12/2010
Total cost:	€ 6 500 000
EC contributions:	€ 3 860 000
Project funded by DG INFSO	



SAFERIDER

Advanced telematics for enhancing the SAFETY and comfort of motorcycle RIDERS

Objectives

SAFERIDER aims to enhanced PTW riders' safety by applying ADAS/IVIS on PTWs of all types for the most crucial functionalities and develop efficient and rider-friendly interfaces and interaction elements for riders' comfort and safety. Relevant applications prioritisation is based on in-depth accident studies, riders needs and wants, as well as benchmarking and ergonomic inspection of existing applications. The selected functionalities will be developed according to a modular and multi-layer (perception-decision-action) architecture, allowing multi ADAS/IVIS applications setup and integration.

Expected Outcomes

Four ADAS applications are preliminary planned, namely Speed Alert, Curve Speed Warning, Frontal Collision Warning and Intersection Support, as well as four IVIS applications, namely eCall, Telediagnostic Services, Navigation and Route Guidance, Weather, Traffic and Black Spot Warnings. They are supported holistically by optimal and concise warning concepts and strategies, supported by new haptic elements, an integrated smart helmet and context-related HMI adaptation, integrated upon three riding simulators and eight PTW demonstrators of three manufacturers (PIAGGIO, TRIUMPH and YAMAHA) and tested in six sites Europe-wide.

Starting date:	01/01/2008
Closing date:	31/12/2010
Total cost:	€ 5 370 000
EC contributions:	€ 3 500 000
Project funded by DG INFSO	

TELEFOT

Field operational tests of aftermarket and nomadic devices in vehicles

Objectives

The objectives of the TeleFOT project are to assess the impacts of functions provided by aftermarket and nomadic devices in vehicles and raise wide awareness of their traffic safety potential. These devices can provide different types of driver support functions and almost nothing is known about their safety and other impacts yet. The market penetration of portable navigators and smart phones is exploding today. The timing for the project is ideal.

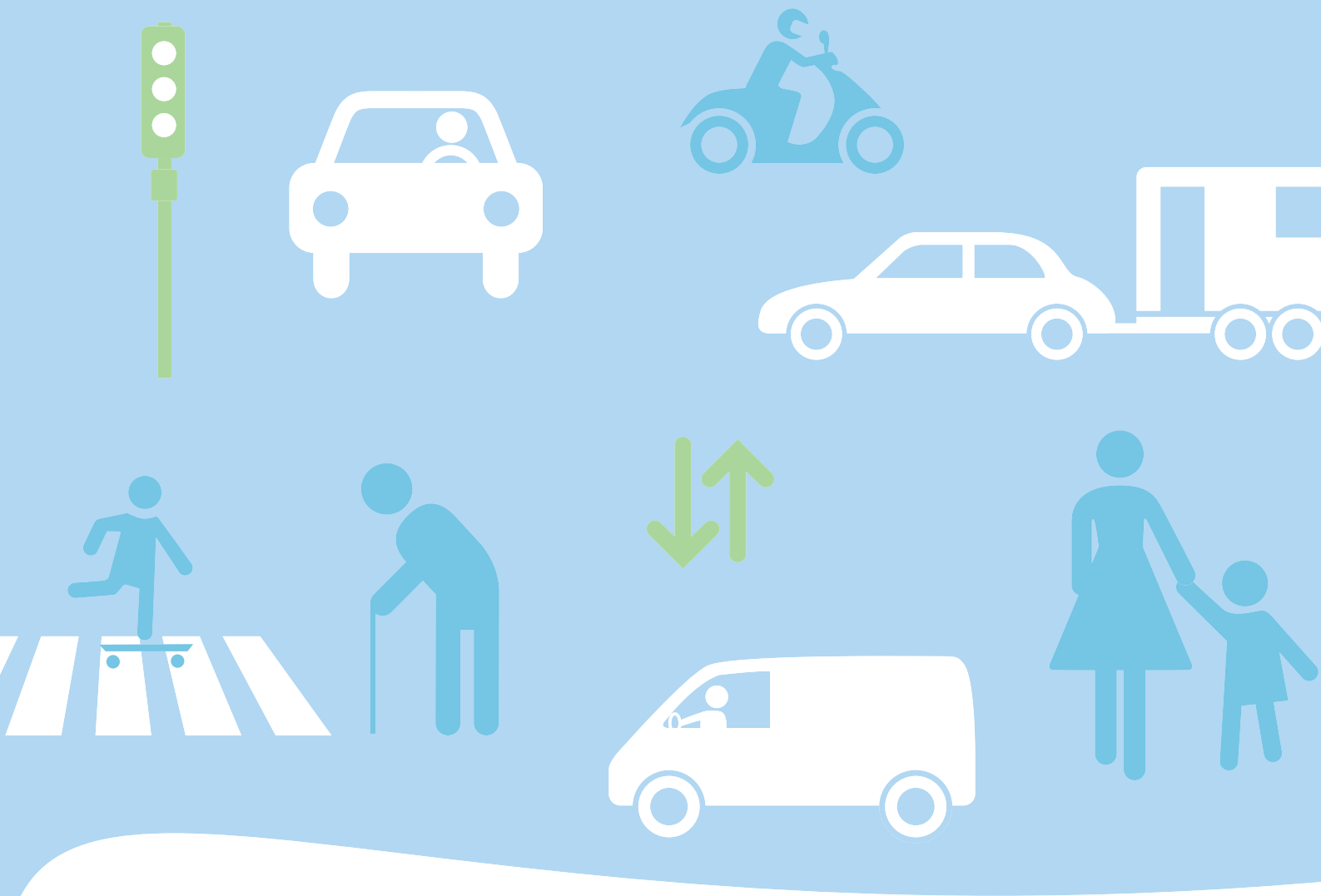
The functions to be tested cover two broad areas: functions promoting safe driving and economic and fuel efficient driving. These are speed information, traffic information, road weather information and 'green driving' support. The impacts are assessed on levels ranging from usability, behaviour and incidents, safety, green driving and efficiency to the impacts on the transport system. Attention will be also paid to possible negative impacts, since especially smart phones are not

originally designed for vehicle use and navigators may have problems in fixing and positioning in the cockpit. The project also aims at speeding up the penetration of systems able to 'see' beyond drivers' field of vision in conditions where good situation awareness is needed. TeleFOT provides opportunities to test the impacts of similar functions that future cooperative systems will provide after their development challenges have been solved in the coming years.

Expected Outcome

In fact, aftermarket and nomadic devices provide an alternative to some important cooperative driving and ADAS functions for many years ahead. The concept comprises of creating three European test communities: Northern, Central and Southern. About 3 000 drivers participate in the tests. The project has strong national support and no resources are needed for setting up the testing infrastructures. Business models are also studied.

Starting date:	03/11/2008
Closing date:	31/10/2011
Total cost:	€ 2 302 210
EC contributions:	€ 2 193 000
Project funded by DG INFSO	



DG TREN Studies and Campaigns on Road Safety



DG TREN funded studies and campaigns

In its policy making activities the services of DG TREN E3 have made use of a number of studies to support policy decisions. They also granted a number of subvention for the development of methods and systems aimed at deploying safety measures

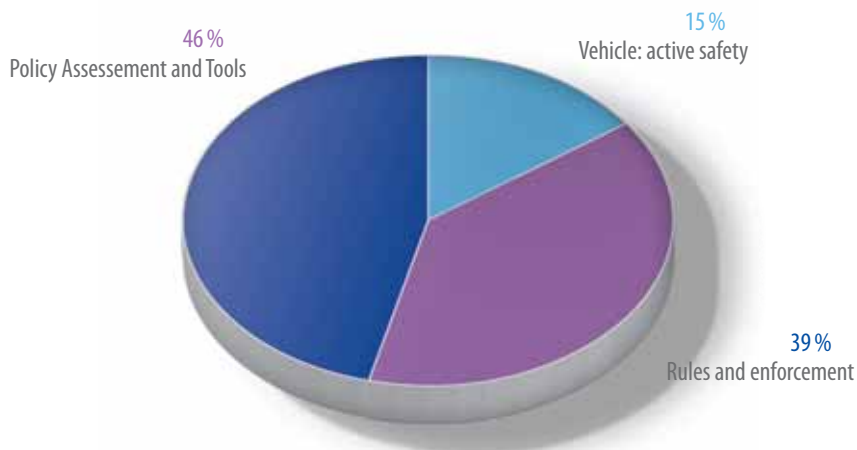
in the Member States. DG TREN funded also a number of campaigns in order to ensure that the European guidelines towards an increased road safety are made known and applied throughout the EU.

A detailed list of all these activities is presented in this report.

Studies commissioned by Road Safety Unit DG TREN

Acronym	Domain	Cost (€)	Duration
CAPTIVE	Rules and enforcement	449 968	01/01/2005 - 31/12/2005
CONSPICUITY	Vehicle: active safety	176 210	01/12/2003 - 01/12/2004
DRL	Vehicle: active safety	340 893	01/01/2003 - 01/01/2004
IMPACT ECONOMIC	Rules and enforcement	117 750	25/11/2002 - 01/06/2003
IMPACT LEGAL	Rules and enforcement	213 800	25/11/2002 - 31/05/2003
IMPROVER	Policy Assessment and Tools	1 402 571	23/11/2004 - 23/05/2006
MIRRORS	Vehicle: active safety	87 274	01/12/2003 - 01/06/2004
SCHOOL TRANSPORT	Policy Assessment and Tools	118 607	01/12/2003 - 01/10/2004
TRAFFIC RULES STUDY	Rules and enforcement	784 899	01/12/2002 - 01/12/2003
TRANSPORT COMPANIES	Policy Assessment and Tools	295 150	01/12/2003 - 01/02/2005
Total Cost		€ 3 987 122	

36



Studies commissioned by Road Safety Unit DG TREN by domain



Description of studies

CAPTIVE

Common application of traffic violations enforcement

01/01/2005 - 31/12/2005

Why CAPTIVE?

CAPTIVE was initiated to identify the steps that could be taken at a European level to implement a pan-EU approach to cross-border enforcement involving all Member States.

Improving compliance with road traffic laws is seen as one of the main ways of achieving the reduction of accidents and injuries.

Strategies to improve compliance with road traffic laws typically involve three aspects: driver education, road engineering and enforcement. When education and engineering do not have the desired impact on compliance, enforcement becomes a necessary sanction. The deterrent effect of penalties imposed through the enforcement process aims to change driver behaviour and ultimately, achieve a greater degree of compliance.

Main results and recommendations

The imposition and enforcement of penalties on non-resident violations of road traffic rules has yet to be achieved at an EU level.

Despite a number of regional bi- and multi-lateral agreements around Europe which have shown that cross-border cooperation can be effective, a number of barriers to effective EU-wide cross border enforcement remain to be addressed.

CAPTIVE has shown that the basis for implementing effective cross-border enforcement across the EU has to be a consistent, and coordinated cross-border cooperation between Member States. CAPTIVE has therefore defined the concept of a 'common approach' to cross-border enforcement which aims to ensure fair and equal treatment of all road users and to help improve road safety by implementing the theoretical benefits of cross-border cooperation in an operational environment.

The results of CAPTIVE have been the basis for drafting the Directive COM (2008)151, still under discussion at the European Council.

CONSPICUITY

Conspicuity of Heavy Goods Vehicles

01/12/2003 - 01/12/2004

Why CONSPICUITY?

Of all vehicle categories, Heavy Goods Vehicles (HGV) are involved in an over-proportional number of fatal accidents relative to their share of the vehicle fleet. Although only 25 % of the overall traffic travels at night-time, about 40 % of the accidents happen during this period. As it has been proved, the visual capacity of the human eye at night is only 5 % of its visual capacity during day-time. Consequently, it seems that this reduced visual ability of car-drivers at night-time plays an important role, especially in crashes of cars into the rear or side of HGV.

Main results and recommendations

Studies have shown that contour-marking of HGV provides the highest degree of conspicuity and significantly reduces the reaction time of car-drivers.

For an optimal marking of HGV, it is recommended to equip the side and rear with a contour-marking. At least 80 % of each side should be marked.

Colourless 'white' retro-reflective material provides the highest 'coefficient of retro reflection' and thus the highest effectiveness.

The results of CONSPICUITY have been the basis for Directive 2007/35 DG ENTR which only considered indications for rear contour marking.

DRL

Daytime running lights

01/01/2003 - 01/01/2004

Why DRL?

The scope of this study was to assess the effectiveness of the currently legislated requirements for the use of daytime running lights in the EU and elsewhere, and how that legislation has been implemented in these countries. The study assessed the various evaluations and made specific cost-effectiveness

recommendations for the introduction of DRLs, taking into account the various positive and possible negative road safety impacts (casualty reduction ranges for various types of road users) and environmental impacts (increased fuel consumption and CO₂ production). It also investigated possible negative environmental impacts of the use of DRLs relative to other in-vehicle electrical equipment, such as air conditioners, etc.

Main results and recommendations

The study has shown that the preferable policy option for DRL implementation is the technical measure of automatic dedicated DRL for new cars, combined with a behavioural



measure requiring the mandatory use of low beams for existing cars. As a technical measure, automatic dedicated DRL are preferred above automatic low beams because dedicated DRL not only result in the highest accident reduction and the lowest increase in pollution (CO₂ emissions), but also in the fairest distribution of road safety benefits over the various road user categories. For these reasons, the proposed technical measure of automatic dedicated DRL is expected to result in the highest level of public acceptance.

Since the use of DRL is controversial in some EU-countries, a gradual approach may be desirable in order to give people

time to adjust to the changes and accept these as an improvement. The introduction of recommended DRL should be preceded and accompanied by a large-scale publicity campaign on TV, radio and in the newspapers, emphasising the importance of contrast in aiding visual perception and the resulting road safety benefits.

The results of DRL have been the basis for Directive 2008/89 DG ENTR for new vehicles. A proposal for an integrating Directive for existing vehicles is in progress.

IMPACT ECONOMIC

Cost benefit analysis of road safety improvements 25/11/2002 - 01/06/2003

Why IMPACT ECONOMIC?

The Commission intended to submit to the European Parliament and the Council of Ministers a package of two proposals for directives, one dealing with the enforcement of laws relating to speeding, drink driving and non-use of seat belts with respect to all road users, and the other consisting of a 'refonte' of existing EU legal instruments dealing with enforcement of EU safety rules for commercial road transport.

Main results and recommendations

The analyses presented in this report provide an estimate of the costs and benefits for each of the proposed initiatives. This final report provides results for the proposed countermeasures against speeding, drink driving, and non-use of seat belts, and for two scenarios:

- bringing the performance of all Member States up to the performance of the best performing State (UK for speeding and Sweden for drink driving and seat belt use);
- applying the countermeasures proposed in the Commission's Working Paper on enforcement in the field of road safety.

The analyses indicate a very substantial positive benefit is all cases, and for both scenarios. If all three programmes of countermeasures are implemented in parallel, the total net benefit is likely to be less than the sum of the three individual programmes. This is because drivers in individual crashes may exhibit two or more of the behaviours that the programmes are aimed at preventing. For example, if an accident involving a speeding drunk driver who is not wearing a seat belt is prevented or reduced in severity, then the benefits are only counted once not three times. The simplest assumption for calculating the combined effect is to assume that the unsafe behaviours are randomly distributed among the whole population of drivers. In this case, the combined effect is multiplicative rather than additive.

38

IMPACT LEGAL

Information gathering on speeding drink driving and seat belt use in the Member States 25/11/2002 - 31/05/2003

Why IMPACT LEGAL?

The aim of the study is collating the rules related to speeding, drink driving and seat belt use, for all the Member States, as well as the actions implemented in order to comply with such rules.

Main results and recommendations

Collection the following information on the three above mentioned topics:

- the existing traffic rules as laid down in relevant legal rules;
- the sanctions and penalties (administrative as well as judicial) laid down for infringement of the rules;
- the practice of checking infringements to the rules;
- the practice of sanctions and penalties actually applied, including court decisions.

Results of these studies support the goal to harmonising European traffic rules.

IMPROVER

Impact Assessment of Safety Measures for Vehicles and Road Equipment 23/11/2004 - 23/05/2006

Why IMPROVER?

The study was commissioned to examine the following aspects of road safety:

- the impact on road safety due to the increasing use of sports utility and multipurpose vehicles;
- the impact assessment of measures improving the road safety of light vans;



- the impact of Cruise Control on traffic safety, energy consumption, and environmental pollution;
- the harmonisation of road signs and road markings from a safety point of view.

According to the tasks the project is divided into **four subprojects**.

1. Impact on road safety due to the increasing use of sports utility and multipurpose vehicles

Sales trends indicate that the European fleet is changing. Automobile manufacturers are offering a wider range of vehicle models in terms of kerb mass and body configurations. The growing number of Multi-Purpose Vehicles (MPVs) and Sport Utility Vehicles (SUVs) may create new safety issues for road safety in Europe.

Main results and recommendations

This study has shown that both geometrical incompatibility and stiffness/mass incompatibility appear to be a factor in the accidents observed. A multi-step approach requiring minimisation of geometric variations and harmonisation of structural properties is necessary to gain better interaction and avoid overly stiff vehicles. It is important to recognise that the observed problems can be avoided with the introduction of compatibility based safety requirements. These requirements are of particular relevance for SUVs since the data show that they are more unsafe than MPVs or other passenger cars. Activities like VC-Compat can be used to drive these solutions forward and it is recommended that their effect should be addressed in future research studies commissioned by the EC. A review of the current test protocols for road equipment was studied: the current test vehicles employed to test roadside safety equipment were shown to poorly represent the SUV in the current and predicted vehicle fleet.

2. Impact assessment of measures concerning the improvement of road safety of light goods vehicles (LGV)

The increasing participation of light goods vehicles (LGV) in road traffic, especially considering the growth of courier and express services, is of growing concern for road safety in recent years. In the last years, both the number of LGV and their participation in accidents increased. LGVs' driving comfort leads driver to forget that the total weight of the vehicle is two to three times the weight of a passenger car. In normal driving conditions nothing will show that these LGV are hard to handle. However, in unexpected situations, like a sudden avoidance manoeuvre, the LGV may become unstable and drivers will not be able to cope with this critical situation.

Main results and recommendations

The cost-benefit analysis (CBA) yielded a B/C ratio greater than 1 for a professional LGV *driver training programme*. However, costs for loss of working time due to the training and for providing a vehicle for the training were not taken into consideration. A B/C ratio greater than 1 was also calculated for *devices to increase seat belt wearing* and ESP reached a B/C ratio of one. Altogether, this indicates that, while all monetary effects are considered the seat belt-reminder is the first-best measure and professional driver training is the second-best

safety measure. Also ESP is economically justifiable. These measures are recommended to the European Commission for further consideration.

Due to the fact that it is not possible to give money value the social disadvantages associated with an increase of the minimum driving age for LGVs it is not possible to derive the same kind of B/C-ratio as for the other measures. However, an expected accident cost reductions of € 3.8 billion is compared to the other addressed measures a relatively low value, not recommending an increase of the minimum driving age for further consideration.

3. Impact of cruise control on traffic safety, energy consumption and environmental pollution

The type approval of vehicles equipped with Cruise Control (CC) is currently not subject to any specific national or international regulation. A further development of CC is 'Adaptive' or 'Intelligent Cruise Control' (ACC). This advanced driver assistance system combines CC with an automatic maintenance of a predefined distance to the preceding vehicle.

Main results and recommendations

The subproject discovered no major safety, energy consumption or environmental pollution issues with respect to CC. However several areas of possible concern were noted. The work undertaken here has shown that there are many knowledge gaps and many issues of possible concern. In contrast to the more complex ACC, little research has been done specifically on CC. Although ACC (that currently is far from replacing CC on the market) can help to avoid some hazards connected to CC (e.g. smaller between-vehicle distances), several new hazards are created (e.g. over-reliance of the driver on the system; distraction of the driver by doing other things; driver being 'out of the loop'; over-estimation of system functions). To avoid these possible drawbacks of ACC, new developments are currently being introduced/assessed that combine ACC with a collision warning/emergency braking function. On the basis of current knowledge, it is not possible to directly compare the effects of the three systems with respect to traffic safety, environmental pollution, and fuel consumption. But it is possible to estimate that the more complex a system is, the more functionally promising it is on the one hand, and the more the driver is 'out of the loop' or potentially distracted on the other hand.

4. Harmonisation of road signs and road markings on the TERN (Trans European Road Network) from a safety point of view

The continuing increase in vehicular traffic in the EU, together with the greater movement of freight across Europe, has resulted in the need to have dedicated road networks in the EU, whose increased importance is one reason for the EC to demand better safety standards in road traffic. Fixed, vertical traffic signs and road markings accomplish an important contribution to traffic safety. Deployment of traffic signs is a national duty, however, road signing systems on European roads vary between countries. This variation may have a significant impact on traffic safety.



Main results and recommendations:

The work developed four harmonisation scenarios. The first scenario showed harmonisation of relatively low cost measures that could be realised in the short term. The second scenario consisted of urgent harmonisation needs, but the exact means for harmonisation are not known until further work and research was undertaken. The third scenario involved long-term measures, as the costs of harmonisation exceed the estimated safety benefits likely to be obtained in a single year. However, the harmonisation need is high-priority and safety would improve. The fourth scenario comprised a variety of details

(14 aspects in total) in road signing differences among EU countries. Their safety effects were not assessed to be notable separately, but together they demonstrated the clutter and inconsistency that foreign drivers have to face on the TERN. Thus, the combined effect of harmonisation may be substantial as it meets the general demand for continuity and uniformity of road signing on the TERN in the long term.

Results of the four sub-projects are to be taken into consideration for future legislation activities.

MIRRORS

Cost-benefit analysis of blind spot mirrors

01/12/2003 - 01/06/2004

Why MIRRORS?

The Commission has implemented a directive to make the fitting of mirrors and supplementary systems for indirect vision compulsory for specified vehicle types. The principal objective was to reduce the number of 'blind spot' accidents. This directive only applied to new vehicles. The objective of the study was to assess, by means of cost benefit analysis, the probable consequences of extending this legislation to cover existing vehicles.

Main results and recommendations

The analysis showed that retrofitting of Class IV/V mirrors is justified even if retrofitting is delayed to 2007 or 2008. However, the Net Present Value falls significantly for each year of delay. Also there is a significant overhead cost in retrofitting (development of legislation and perhaps development of suitable mirrors), so the legislation should be introduced as soon as possible for maximum benefit.

Basis for Directive 2007/38/EC on the retrofitting of mirrors to heavy goods vehicles registered in the Community.

40

SCHOOL TRANSPORT

Road safety in school transport

01/12/2003 - 01/10/2004

Why SCHOOL TRANSPORT?

Whereas special EU-wide statistics on accidents during the school travelling are not available, considering the distribution of accidents of children over a normal work day, it is clear that to and from school, there is a potential risk for children to be involved in an accident. The EC already launched two studies in 1991 and 1998 to analyse the European situation in school transport. An update of such findings was considered necessary.

Main results and recommendations

Overall findings from the analysis carried out in this study confirm the main conclusions and recommendations already indicated in previous studies, which point to:

- improvements in the coordination between the different authorities;
- integration of school transport in the local and regional mobility processes;

- increase awareness of children's safety during school journeys and promotion of periodic retraining for school transport drivers;
- new procedures enabling a more detailed analysis of accidents, using actual ones with the view to improve accident prevention.

School transport is only considered as such whenever performed by dedicated bus services, therefore accident data in general only considers a school transport accident when it takes place with a vehicle identified as such. The extension of the definition of school transport accident to all transport modes (public, private, walking and cycling) used in route to schools is therefore imperative for a clear assessment of advantages and disadvantages of this mode. Successful measures in child safety result from the combination of hard measures targeted at the road/urban environment and vehicle design with soft measures aimed at addressing the behaviour of road users.

Results lead to a higher attention to continuous training of drivers and detailed accident data collection and analysis.



TRAFFIC RULES STUDY

Study on road traffic rules and corresponding enforcement actions in member states of the European Union

01/12/2002 - 01/12/2003

Why TRAFFIC RULES STUDY?

The study was commissioned to have information and to make a comparative analysis of road traffic rules and corresponding enforcement in the Member States of the European Union (EU15).

Main results and recommendations

There is consistent evidence showing that the promotion of gradual convergence of the main traffic rules and the corresponding effective enforcement needs to be supported by an integrated information system for road traffic in Europe. One of the first aspects to be considered in the development of such a system has to do with the harmonisation of concepts and terminology. This is a basic condition to enable cross comparison of rules and enforcement between countries and to perform statistical analysis.

Results were partly translated in an overview by category or by country in the web page of Road safety Unit: http://ec.europa.eu/transport/road_safety/observatory/traffic_rules_en.htm

TRANSPORT COMPANIES

Application of road safety related community legislation in transport companies

01/12/2003 - 01/02/2005

Why TRANSPORT COMPANIES?

The aim of the project was the assessments of how road transport companies can be better involved in the task of halving the number of road accident victims in Europe. The safety situation was investigated by a combination of questionnaires and expert interviews.

Main results and recommendations

The differences in the application of safety practices within transport companies have a direct influence on company incident rates. The human error is the most common accident cause. The European researches in this sector are concentrated on driver fatigue and accident analysis. The low attention for safety issues is due to limited margins and the need to respond to the demand of the customers that wants a rapid and cheaper delivery.

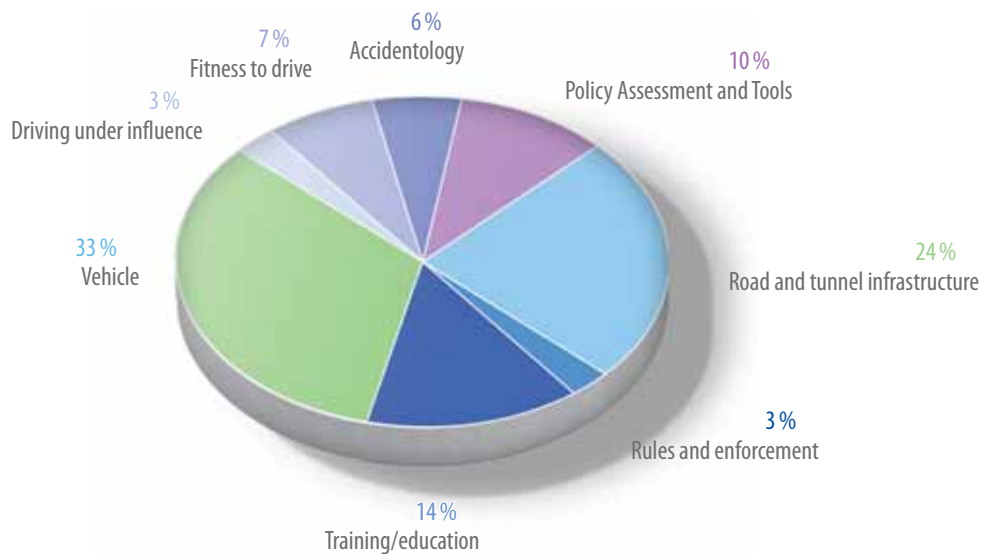
Results of this study have been the basis for the Directive 2003/59/EC on the initial qualification and periodic training of drivers of certain road vehicles for the carriage of goods or passengers, and Regulation (EC) No 561/2006 on the harmonisation of certain social legislation relating to road transport.

Grants awarded by Road Safety Unit DG TREN

Acronym	Domain	Total Cost (€)	EC Contributions (€)	Duration
ALCOLOCK	Vehicle: active safety	1 194 178	597 089	01/01/2004 - 01/07/2006
AUTOFORE	Vehicle: periodic technical inspection	600 000	300 000	01/02/2005 - 01/01/2007
BE SAFETY AWARE	Vehicle: active safety	595 134	297 567	15/03/2007 - 14/03/2008
CITA	Vehicle: periodic technical inspection	600 000	300 000	05/07/1999 - 04/07/2002
ESUM	Policy Assessment and Tools	2 407 456	1 203 728	30/05/2008 - 30/11/2010
ETAC	Accidentology	609 200	304 600	01/05/2004 - 30/09/2006
EURO-AUDITS	Road and tunnel infrastructure	110 000	55 000	01/04/2007 - 31/07/2007
EURORAP	Road and tunnel infrastructure	948 498	474 249	01/01/2005 - 31/12/2007
EURORAP II	Road and tunnel infrastructure	1 988 678	994 339	01/01/2005 - 31/12/2007
EUROTAP	Road and tunnel infrastructure	4 183 986	1 500 000	01/01/2005 - 31/12/2007



Acronym	Domain	Total Cost (€)	EC Contributions (€)	Duration
EVI	Policy Assessment and Tools	804 318	402 159	01/01/2005 - 31/12/2007
GLARE	Fitness to drive	1 536 038	766 690	01/01/2003 - 21/12/2004
HERMES	Training/education	1 000 000	500 000	01/03/2007 - 28/02/2010
IASP	Road and tunnel infrastructure	327 000	100 000	01/04/2004 - 31/03/2007
IDELSY	Vehicle: periodic technical inspection	896 700	448 350	01/04/2004 - 01/12/2005
MAIDS	Accidentology	781 770	390 000	01/12/2001 - 01/12/2002
MEDRIL	Fitness to drive	552 000	276 000	01/03/2004 - 01/03/2006
CLOSE TO	Training/education	2 000 000	1 000 000	01/02/2004 - 31/01/2006
NPACS	Vehicle: passive safety	2 243 527	600 000	01/01/2004 - 01/01/2006
QUERY	Accidentology	120 000	60 000	15/07/2004 - 14/07/2006
ROSACE	Training/education	725 000	362 810	01/04/2007 - 31/03/2009
ROSITA 2	Driving under influence	895 000	400 000	01/12/2002 - 01/01/2005
SAFETY SEC BELT	Policy Assessment and Tools	1 143 536	571 768	01/01/2004 - 31/12/2005
SARAC 2	Vehicle: passive safety	1 483 789	667 703	01/03/2003 - 01/04/2006
SAU	Accidentology	309 852	197 962	01/04/2004 - 31/03/2007
SPEEDALERT	Vehicle: active safety	756 669	378 334	01/05/2004 - 01/04/2005
SUNFLOWER	Policy Assessment and Tools	208 154	104 077	01/01/2002 - 31/12/2002
SUNFLOWER+6	Policy Assessment and Tools	1 019 331	509 666	01/04/2004 - 01/12/2005
VERA3	Rules and enforcement	1 000 000	500 000	01/01/2006 - 31/12/2008
VERONICA II	Vehicle: passive safety	2 166 864	1 083 432	01/05/2007 - 30/04/2009
YOUTH ON THE ROAD	Training/education	523 154	250 000	22/12/2003 - 22/12/2005
Total Cost		€ 33 729 832		
EC Contributions		€ 15 595 523 = 46.23 %		



Total Cost from 2001 until 2007 by domain



Description of studies

ALCOLOCK

Alcolock implementation in the European Union; an in-depth qualitative field trial

01/01/2004 - 01/07/2006

Objective

The aim was to assess the practical, psychological, social and behavioural impact of alcolocks (alcohol activated vehicle immobiliser) by interviewing the drivers about their experiences.

Outcome

From the similarities and differences between commercial and non-commercial contexts for alcolock implementation, it became clear that the impact of the alcolocks depends on the specific circumstances in which the alcolock is used. With respect to these circumstances, the commercial or non-commercial character is only one element. The specific programme conditions that are defined for the alcolock users, the specific procedures used to follow-up the test-results and the possible circumventions, the specific consequences of all the possible events and the specific social or commercial environment and society, in which the alcolock is used, are equally important factors determining the impact of the alcolock. All these factors will have to be taken into account in future commercial and non-commercial alcolock applications in Europe.

AUTOFORE

Study on the Future Options for Roadworthiness Enforcement in the European Union

01/02/2005 - 31/01/2007

Objective

The purpose of the AUTOFORE project was to recommend improvements in roadworthiness enforcement in the EU to ensure that the benefits accruing from the original design and manufacture of vehicles are retained, where justified, throughout the life of those vehicles.

Outcome

The AUTOFORE study reviewed the purpose of roadworthiness enforcement and the potential for improvement of current roadworthiness enforcement measures. A strategy for change

is proposed, which is to introduce, where justified: higher roadworthiness standards; broadening of the scope of the standards to include items that currently are not included and vehicle types currently not controlled; and improving the level of compliance.

The study makes the following recommendations:

Recommendation 1 – Amend Directive 96/96/EC to increase the frequency of inspection for older vehicles of categories 5 and 6, as defined in the Directive.

Recommendation 2 – Amend Directive 96/96/EC to include the examination of safety relevant electronic systems that are already widely fitted (airbags, ABS and ESC).

Recommendation 3 – Amend the scope of Directive 96/96/EC to include two wheeled motor vehicles (international categories L1 and L3).

Recommendation 4 – Support to three further projects in order to be able to develop the options to be introduced by 2020.

43

BE SAFETY AWARE

Bringing eSafety to the market through Awareness

15/03/2007 - 14/03/2008

Objective

eSafetyAware! seeks to accelerate the market introduction of such life-saving technologies by organising information campaigns and dedicated events aimed at creating awareness of eSafety benefits among policy makers and end users.

Outcome

ChooseESC! is the first campaign launched by eSafetyAware!. The campaign is focused on Electronic Stability Control (ESC). The technology, also known by a series of other names such as Electronic Stability Programme (ESP), Vehicle Dynamic Control (VDC), Vehicle Stability Assist (VSA), etc. has proved highly effective in preventing skidding, and has been hailed the greatest road safety innovation since the seat belt.



CITA

CITA research study programme on electronically controlled systems on vehicles

05/07/1999 - 04/07/2002

Objective

Electronically controlled systems of increasing complexity are being fitted in growing numbers to new vehicles. Vehicle safety and environmental protection is increasingly dependent on the proper functioning of these systems. At present there is insufficient data about the reliability of electronically controlled systems and little information about how they could be checked during periodical and other inspections in the event that this was found necessary.

Outcome

Electronically controlled systems on vehicles have failure rates comparable to other mechanical systems considered important enough to be included in periodical inspection.

Accidents and injuries, caused by faults in electronically controlled systems, reduce road safety. This reduction of benefit as a consequence of electronic faults can be quantified.

Procedures have been suggested and shown to be practicable to check electronically controlled systems and detect faults during periodical inspection.

Legislative authorities should now implement periodical inspection requirements to regain as many as possible of the benefits of electronically controlled systems lost because of faults.

Cars currently under development show rapid increases in the number of electronic systems fitted. The inspection that is demanded will also help guarantee the increased traffic safety resulting from these additional systems.

eSUM

European Safer Urban Motorcycling

30/05/2008 - 30/11/2010

Objective

eSUM is a collaborative initiative between industry and local authorities of Europe's principal motorcycle cities to identify, develop and demonstrate measures designed to deliver safer urban motorcycling in the short, medium and longer term.

Within the eSUM framework, a diagnosis is made (urban P2W RS2 benchmarking, plus accident analysis to identify vehicle features leading to safer P2W use) and Best Practice is reported and transferred to other cities on collision prevention, accident avoidance and mitigation of accident severity.

Outcome

The study is still ongoing.

ETAC

European Truck Accident Causation

01/05/2004 - 30/09/2006

Objective

The aim of the study was to identify the main causes of accidents involving trucks. This information can be used to give guidance to policy and decision makers for future action which can contribute to the improvement of road safety.

Outcome

The main accident cause is linked to human error in 85.2%. Special attention was paid to accidents with a pedestrian, which cover 6.2% of all cases. The top main causes for accidents between a truck and other road user are: non-adapted speed, failure to observe intersection rules and improper manoeuvre when changing lanes.

The study showed that the load of the truck is the main cause of the accident in only 1.4% (nine accidents) of all accidents in the database. In three of the nine accidents the truck tipped over.

The study also showed that the load can, however, contribute to the severity of the accident.

Based on the 624 accidents in the database, fatigue was the main cause in only 6% of the accidents. 37% of these accidents were fatal.

In 5% of the accidents, the road conditions were the main cause of the accident. Half of these accidents happened on an inter-urban road.

Among the accidents (30) occurring in an intersection and involving at least one vulnerable road user (a pedestrian or a two-wheeler) blind spots from the truck driver's view was the main cause in 14 of the accidents. When blind spot is the main cause of the accident in this configuration, two-thirds of the accidents are fatal accidents.

59% of the accidents involved two vehicles. 12% involved three vehicles and 7% were single truck accidents. It should be noted that 18% of the accidents involve a vulnerable road user (pedestrian and/or two-wheeler).



EURO-AUDITS

European Road Safety Auditor Training Syllabus

01/04/2007 - 31/07/2007

Objective

The European Road Safety Auditing Training Syllabus addresses the knowledge gap in safety audit by proposing a pan-European syllabus of training modules which auditors must be exposed to in order to carry out their assignment effectively. On the basis of these generic modules, national training courses tailored to specific legislation and engineering practices can then be developed at the discretion and under the supervision of national road authorities.

Outcome

The comprehensive and practical training syllabus is designed to provide the essential core knowledge and skills to prospective road safety auditors in order to ensure that Road Safety Audits of all relevant schemes across the Member States of the European Union are carried out to a consistent high quality by appropriately qualified and experienced auditors. The syllabus aims to provide training at both introductory and advanced levels, using a combination of teaching methods, including interactive presentations by experienced Road Safety Auditors, case studies and practical workshops. A certain level of prior knowledge and experience will be a pre-requisite to training and formal delegate assessments are proposed at the conclusion of the syllabus, as a means to obtain accreditation from an independent body. An expectation of continued professional development will ensure that a high level of expertise is maintained.

EURORAP I and II

European Roads Assessment Programme

01/01/2005 - 31/12/2007

Objective

The aim of EuroRAP was to provide a safety rating for roads across Europe. This was aimed at generating consumer information for the public and give road engineers and planners vital benchmarking information to show them how well, or badly, their roads are performing compared with others, both in their own and other countries.

Outcome

Since its launch EuroRAP has successfully highlighted the dangers of poor road design in countries from the Arctic to the Mediterranean through two major programmes of work. These achievements have been underpinned by the new global standards EuroRAP has set for measuring the safety of roads and tracking improvements. EuroRAP is turning the lessons of its first two programmes into direct action across Europe. At the heart of EuroRAP III, the 2007-2009 programme, is the commitment to forge a relationship with the new EU Member countries in eastern Europe where the risks of dying in serious road crashes are highest.

45

EUROTAP

European Tunnels Assessment Programme

01/01/2005 - 31/12/2007

Objective

Over a three-year period, at least 150 road tunnels, of at least 1 000 m in length located on the Trans-European Road Network (TERN) were to be assessed for their level of road safety. The results of these annual assessments were to be published widespread across Europe and accompanied by a series of complimentary measures intended to reinforce the safety messages to users of tunnels, to be disseminated off the back of the assessment programme.

Outcome

The results of the tunnels tested have been published every year in media all across Europe. Tunnels users are able to access, via the Internet, safety relevant information about individual tunnels in seven different languages. A European Tunnel Audit Report was produced covering nine years of tunnel tests highlighting what has been achieved and what still needs to be done. Information leaflets were targeted at motorists giving information on how to behave correctly in tunnels.

Two more key aspects could be added to the activities pursued up to now: training for tunnel staff and for tunnel planners, as they have a decisive role to play in the management of incidents.



EVI

Electronic Vehicle Identification

01/01/2005 - 31/12/2007

Objective

The aim of EVI study was to investigate the feasibility of an EU-wide Electronic Vehicle Identification (EVI) system. The project had to identify and assess the main technical and non-technical issues facing EU-wide implementation, and it should have provided the basis for decision-making by the EU Member States.

Outcome

EVI is both an enabling system and an application. EU-wide deployment is feasible and has the potential to enable

applications that can bring significant benefits to the citizens of Europe. The consortium recommends taking the topic forward and outlines the decisions that are required to be taken and by whom, prior to implementation and deployment.

At the European Community level, there are various legal bases for a European framework for adoption of an EVI system under the specific Treaty of the European Union provisions. These have different implications for adoption and therefore different length of time in which such policy could be implemented.

It is concluded that the economic feasibility of EVI depends both on the level of technology deployed and on the extent to which related applications which are enabled by EVI are deployed in support of policy goals.

GLARE

Relevance of glare sensitivity and impairment of visual function among European drivers

01/01/2003 - 21/12/2004

Objective

Currently there are no demands placed upon the glare sensitivity of drivers, even though it is generally accepted as important for traffic safety. The reason is that no standard for such measurement exists. In this project it was proposed

to develop an instrument to measure glare sensitivity for driving licence application and to establish the relation between glare sensitivity and the degree of visual impairment in driving situations.

Outcome

The project designed a suitable instrument to measure glare sensitivity (i.e. retinal stray light) for driver licensing application. At the same time a measurement protocol was set up to determine the percentages of visual impairments among European drivers. Basic studies to elucidate the relationship between retinal stray light and actual visual handicap during driving took also place.

46

HERMES

High Impact approach for Enhancing Road safety through More Effective communication Skills for driving instructors

01/03/2007 - 28/02/2010

Objective

HERMES will create an easy-to-use training package on teacher-trainee communication in classrooms, in cars and on dedicated tracks. A multi-national team of experienced driving

teachers, psychologists, educational and coaching experts has been created for this purpose.

The main aim is to create a short 3-5 day training course for driving instructors to allow them to develop their 'coaching' skills. In addition, a number of coaching scenarios will be developed to enable instructors to coach in on-road training, track training and the classroom, and to meet a wide range of goals in the driver education process.

Outcome

The study is still ongoing.

IASP

Identification of Hazard Location and Ranking of Measures to Improve Safety

01/04/2004 - 31/03/2007

Objective

The target of the project was the performance of a 'project pilot' on two lane rural roads. The project aimed to define methodologies and procedures for the analysis of actual road safety conditions and to arrange maintenance or restoration projects in order to improve safety.



Outcome

A manual called 'Operative procedures for safety inspections on two-lane rural roads' was drafted. The proposed methodology will be applied on a sample of existing roads in order to characterise the defective elements in the different

components of the system driver-road-vehicle-environment which involve levels of unacceptable risk, to define and to carry out appropriate interventions and then to monitor their effectiveness during time.

IDELSY

Initiative for Diagnosis of Electronic Systems in Motor Vehicles for PTI

01/04/2004 - 01/12/2005

Objective

A wide variety of complex, electronically regulated systems are responsible for safety relevant functions in modern motor vehicles. In that context, the project IDELSY showed the possible options for a significant increase of reliability and safety of such systems and therefore the safety of European road transports systems as a whole.

The general target of this project was to improve the existing 96/96/EC Regulation for solving the new vehicle technology, which is more and more electronically controlled and relevant for the road safety while proceeding PTI.

Outcome

An early diagnostic on detection of malfunctions or worn parts prevents accidents and reduces injuries. Therefore, scan tools and test procedures have been developed to address these problems. It was proposed that these tools should be used in the course of periodic vehicle inspections in order to verify the functionality and safety of electronic control units and electronic components and electronic systems during their life cycle on the road.

MAIDS

Motorcycle Accidents In Depth Study

01/12/2001 - 01/12/2002

Objective

PTW riders form one of the most vulnerable groups of road users and road accidents involving injuries to them are a major social concern.

In order to better understand the nature and causes of PTW accidents better the project developed an in-depth study of motorcycle and moped accidents during the period 1999-2000.

Outcome

MAIDS constitutes the most comprehensive in-depth data currently available for Powered Two-Wheeler (PTWs) accidents in Europe.

47

MEDRIL

Study of medical examination for driving licence holders in 4 EU-MS

01/03/2004 - 01/03/2006

Objective

The general objective of the study is to evaluate the medical examination for driving licence holders of a group 1 licence in four EU Member States. These countries represent the different models currently in place around Europe. The study would constitute a first practical step towards best practice guidelines, in terms of procedure and periodicity, for such medical examinations.

Outcome

→ Up to 20% of drivers over 70 years old showed signs of mild dementia on the basis of the mini-mental test. Cases of moderate or serious dementia were, however, extremely rare.

- The added value of age-based obligatory medical testing remained unclear and recommendations for the introduction of such tests at EU level would have been premature.
- The decision on whether to impose ongoing fitness to drive requirements for drivers is not only medical, but also socio-political, as it involves the capacity of autonomous mobility of the individuals.
- Facilities, expertise and services should exist to support drivers in this area and to accurately determine their ability to drive safely. The facilities must either be provided by the State or through private enterprise. This is a costly undertaking; the potential market is, however, constantly growing when one considers the ageing of the European population.
- Restriction of the validity of driving licences to 10 years would allow for some form of screening to take place at the same frequency across the European Union. Regular screening not limited only to elderly drivers would avoid any possible question on discrimination.



CLOSE TO

01/02/2004 - 31/01/2006

Objective

The project task of the CLOSE TO project was to develop an innovative method to make sustainable emotional learning in driving schools possible and thus to literally offer a 'learning that affects you.'

Outcome

CLOSE TO is a fundamentally new educational approach to the partner countries' driving education. Direct confrontation with the risky driving behaviour of their peers and the consequences that go along with it make a lasting impression on the learner drivers. It promotes discussion on the typical causes for risky behaviour, which in combination with a lack of driving experience, are largely responsible for the disproportionate number of accidents caused by novice drivers.

NPACS

New programme for the assessment of child seats

01/01/2004 - 01/01/2006

Objective

European Directive 2003/20/EC on compulsory seat belt wearing/child seat use effectively requires all children who are under twelve years of age and are less than 150 cm tall, to be installed in an appropriate child restraint system when carried

in a vehicle. The different Child Restraint System (CRS) consumer tests in the EU rated differently identical CRSs tested. This is very confusing to consumers. A harmonised test and rating protocol will take away this confusion and offer clearer information to the consumer.

Outcome

NPACS has provided the establishment of scientifically-based EU wide harmonised test and rating protocols that will provide consumers with clear and understandable information about dynamic performance (how much protection could a CRS provide during a collision) and usability of child restraint systems.

48

QUERY

Developing guidelines for a best practice qualification of accident analysts

15/07/2004 - 14/07/2006

Objective

After a traffic accident, the question arises as to the cause of the accident and how it could have been avoided. In most cases, the answer to this can only be supplied by a suitably

qualified accident analyst, who reconstructs the unfolding of the accident by means of the secured evidence material. Random sample surveys have shown that the professional profile of this expert is defined very differently in the various member and accession states of the EU. As in other professional areas, it would be advantageous if this professional field could be harmonised throughout Europe.

Outcome

The project proposed guidelines for a best practice qualification of accident analysis.

ROSACE

Road Safety in cities: change road safety education in Europe

01/04/2007 - 31/03/2009

Objective

Streets are – or should be – children's daily environment, in which they move, interact and grow. In most 'developed' cities, children are increasingly disappearing from the urban scene. They are not using public space and when they are, it is under the watchful eye of adults, caretakers and authorities. While there are some

good reasons for this such as concerns over safety and security, the cost to both the child and urban life is significant.

RoSaCe focuses on the importance of autonomous, safe access to city spaces for children's psychosocial development, health and wellbeing, and that of society in general. Experience demonstrates that the simple process of bringing children, and the whole community, 'back to the street' would, in itself, make streets safer.

Outcome

Project is still ongoing.



ROSITA 2

Evaluation of roadside oral fluid drug tests for the detection of drivers under the influence of drugs

01/12/2002 - 01/01/2005

Objective

The aim was to conduct a US/European international study to assess the performance of on-site oral fluid drug tests to detect illegal drug use among drivers failing a standard field sobriety test.

Outcome

At the end of the study, no device was considered to be reliable enough in order to be recommended for roadside screening of drivers. However, the experience in the state of Victoria in Australia shows that random roadside oral fluid testing of drivers for methamphetamine and cannabis has a deterrent effect. Government officials should carefully weigh the pros (deterrent effect) and the cons (risk that drivers will realise that they often test negative after having used drugs due to the limited sensitivity of the test) of introducing random drug testing with the currently available devices.

SEC SAFETY BELT

01/01/2004 - 31/12/2005

Objective

The aim of this project was to improve road safety in the Southern, Eastern and Central European countries by identifying, evaluating and promoting measures for the accident risk reduction of road users. The countries were Italy, France, Belgium, Cyprus, Malta, Portugal, Slovenia, Spain, Czech Republic, Greece, Hungary, Poland, Slovakia and the Baltic States – these are all countries that display death rates per billion motor vehicle km above the EU average.

Outcome

The project comprised three phases:

- **Identifying Risks and Opportunities** addressed safety practitioners and road users in the SEC-Belt countries. It dealt with the three classical activity areas of transport safety policies: the vehicles, the users and the roads.
- **Evaluating Data and Policies** addressed international safety experts. It focused on overarching transport safety issues such as the evaluation of data and policies.
- **Promoting Practice and Behaviour** addressed local, national and European policy-makers. It promoted best transport safety practice and behaviour in the SEC-Belt countries over a period of three years.

SARAC II

Quality criteria for the safety assessment of cars based on real-world crashes (phase 2)

01/01/2003 - 01/04/2006

Objective

The fundamental problem with the development of a high quality rating system for Europe is the limitations with large scale national accidents statistics, which need to be improved. Measures such as improved injury severity classifications and recording of impact severity or vehicle damage would go a long way to addressing this issue. The project aimed to develop advanced methods of safety ratings and to apply these methods to extended accident databases.

Outcome

The application of safety ratings has been improved and extended by use of large scale national statistics from Great Britain, France and, for the first time in international research, German statistics. The analysis has been extended to Australia/New Zealand results and also Japanese experiences have been integrated in the final report.

The comparison with NCAP results showed that design priorities encouraged by EuroNCAP rating are consistent with a reduced risk of serious injury in cars in real world crashes. The safety of new cars is greatly improved: in the last decade a reduction of serious injury risk of about 50% has been achieved.



SAU

Urban Accident Analysis Systems

01/04/2004 - 31/03/2007

Objective

Even though the accidents that happened in urban zones have a relative smaller seriousness, it is the place where, for the moment, the major number of accidents take place in the EU

Member State, as well as generating serious consequences on the more vulnerable users (pedestrians, cyclists, children, old people...).

Outcome

Thanks to SAU a guide of advices or of 'best practices' was developed in order to implement/improve the systems that deal with the collection, the analysis and the monitoring of traffic accidents in urban zones.

SPEEDALERT

Harmonising the in-vehicle speed alert concept definition

01/05/2004 - 01/04/2005

Objective

The project's main objectives were to harmonise the in-vehicle speed alert concept definition and to investigate the first priority issues to be addressed at the European level, such as the collection, maintenance and certification of speed limit information.

Outcome

A common set of speed limit categories have been developed considering both general and specific speed limits. The specific speed limits can be either fixed or variable (e.g. dynamic speed limits displayed via Variable Message Signs - VMS). These common speed limit categories were classified over the different kind of applicable roads and compared over different European countries. The survey illustrated an extensive array of speed limits used throughout Europe.

50

SUNflower

A comparative study of the development of road safety in Sweden, the United Kingdom and the Netherlands

01/01/2002 - 31/12/2002

Objective

The study was carried out to assess the background to the safety strategies of Sweden, the United Kingdom and the Netherlands: the SUN countries. The results of this study are of special value in the progress of development of the safety programmes of the three countries. The methodology of the study has been designed in such a way that it can be used as a basis for comparative studies among other Member States.

Outcome

General conclusions

- All three countries have achieved similar levels of safety through continuing planned improvements in these levels over recent decades.
- Policy areas targeted have been similar but policies implemented have differed at a detailed level.
- Differences in focus for safety programmes result from both different relative sizes of accident groups and differences in the structure of road safety capability.
- Progress has been achieved through directing improved policies to all three areas – vehicle, road and road users.
- There is room for further improvement in well-established safety fields in all three countries, and scope to learn from each other to ensure collective experience is used effectively.
- Risk factors are provided throughout the report, for the SUN countries, which can be used by other countries as indicators of the levels of safety that are achievable in relation to different aspects of the road safety problem.



SUNflower +6

A comparative study of the development of road safety in 9 European countries

01/01/2004 - 01/12/2005

Objective

The purpose of this study was to develop a method of comparison on road safety that could be applied in many countries. This method provides each country with insight into which measures have been effective, and have thus contributed to greater road safety.

Outcome

One of the goals of the SUNflower +6 project was to develop a methodological framework for a country's road safety footprint. Such a footprint will help to identify strong and weak points, can direct further and more detailed analyses and can assist in showing ways to road safety improvements. The proposed methodology is considered as a first step in the definition of an overall methodology, based on state-of-the-art knowledge and the information gathered. Eventually, it may grow into a widespread tool for benchmarking road safety.

VERA3

Cross-border enforcement of road traffic violations

01/01/2006 - 31/12/2008

Objective

The increasing mobility of European citizens has meant a significant increase in road traffic violations committed by drivers of vehicles registered in other States. The project VERA2 defined the concept of a non-profit organisational and data-exchange

network known as eNFORCE as a potential way to address these so-called non-resident violators. Through VERA3, enforcement agencies in France, the Netherlands, Spain, and Austria are developing and demonstrating eNFORCE in a pre-operational environment.

Outcome

VERA3 focused on the exchange of violation information and notification of non-resident violators allowing delegation of authority to enforce financial penalties in accordance with Council Framework Decision 2005/214/JHA. It has also addressed how vehicle owner information can be exchanged.

51

VERONICA II

Vehicle Event Recording based on Intelligent Crash Assessment

01/05/2007 - 30/04/2009

Objective

VERONICA II is to specify the technical and legal requirements for a possible implementation of Event or Accident Data Recorders in vehicles in Europe. Of major importance is the definition of the trigger sensitivity in order to capture not only hard crash data but also data from collisions with 'soft objects',

i.e. vulnerable road users which represent a relevant part of road users and victims in accidents.

Outcome

EDR data will be used not only for improving accident investigation and speeding-up of court procedures but also for enhanced research in in-depth data bases as these data provide real-life information on the vehicles' and drivers' actions just prior to the crash. The research based on enhanced real-life data will allow for better evaluation of road safety measures in all fields: active and passive vehicle safety, infrastructure, training, regulation and enforcement.

YOUTH ON THE ROAD

22/12/2003 - 22/12/2005

Objective

The project aims at promoting the participation of young people in road safety actions. Youth on the Road will be a

participative platform that will promote youth road safety initiatives at the local level in 100 European cities.

Outcome

A youth and road safety network involving cultural, social and educational communities directly related to children and young adults has been built.



The campaigns were being addressed at three main themes such as:

- Alcohol and drugs.
- Use of seat belts and restraint systems.
- General road safety issues.

The figure above shows as the theme alcohol and drugs is recurrent every year from 2001 until 2010. In particular this is due to *EURO-BOB* campaign with its complementary *NESA*. These campaigns are based on the principle of the designated driver concept: the designated driver is the person who does not drink when he has to drive and who drives the rest of the party home safely.

The methodology used is different but the concept remains the same for the *ENWA* and *VCO*. Thanks to *ENWA*, in night clubs all across Europe on the third Saturday of October, a team of youngsters welcomes the drivers at the entrance and encourages them to take up a responsible attitude behind the wheel. *VCO* organised so-called 'clean parties'.

The use of seat belts and restraint systems is present only from 2005-2008 thanks to *EUCHIRES*. The project is based on the 'Armadillo' campaign launched in 2003 in the Netherlands. This successful campaign inspired organisations from other countries to implement the same kind of approach to promote the use of seat belts.

No specific campaigns were being addressed at vulnerable users such as pedestrian, cyclist and motorcyclist.

It is difficult to measure the effectiveness of the campaigns, but it is clear that a campaign can create a circle of information and highlight the importance of these kinds of social problems. Especially if a campaign is supported by an enforcement of authorities' control it could establish a starting point in the changing of user's behaviours.

Linked to sensibilisation campaigns, the E3 Road Safety Unit and DG TREN funded two interesting projects.

EURO RS WEB

RoadSafetyWeb is a website centralising data of awareness raising campaigns in the field of road safety. Its aim was to create a platform promoting the different campaigns and facilitating the exchange of information about them. The participating organisations can use the campaigns in the database as a source of inspiration for new campaigns.

Moreover, RoadSafetyWeb constitutes a forum for exchanging knowledge and experiences between the participating organisations.

RoadSafetyWeb not only allowed for the centralisation of campaign data using a common structure, it also facilitated searching and analysing these data. By using a single template for organising the data, it is for example possible to have a quick and extensive overview of what is done in the different countries.

Starting date:	22/12/2003
Closing date:	21/12/2006
Total cost:	€ 167 577
EC contributions:	€ 83 788

CAST

Implementing mass media campaigns and evaluating their (isolated) effect on traffic accidents and other performance indicators

Background

The evaluation tool for safety campaigns has to be based on a methodology capable of isolating the effects of a campaign among effects interfering from other parallel measures and has to focus on the direct impact sought, which is a reduction in the number of persons killed and injured in traffic.

There is an urgent need for evaluation research focussing on isolating the effect of road safety mass media campaigns on the number of road crashes and other outcome measures (for example Road Safety Performance Indicators like seat belt wearing rates or the number of drink drivers) from the effect of other supporting activities like enforcement.

Objectives

CAST aimed at developing and assessing an evaluation tool for road safety campaigns. These handbooks will enable the EC to design and implement future campaigns and to evaluate their (isolated) effect on traffic accidents and other performance indicators.

A manual will be developed for governments wanting to set up such campaigns and a campaign will be set up in different member states, including Belgium.

Policy implications

Availability of clear scientific information both on the effectiveness and cost-effectiveness of the isolated effect of road safety mass media campaigns is a prerequisite to design future campaigns in the most effective and optimal fashion as possible. An evaluation tool aiming at producing such information was lacking while it will in turn lead to another useful supporting tool to design campaigns in the best possible way.

Starting date:	01/02/2006
Closing date:	31/01/2009
Total cost:	€ 5 460 000
EC contributions:	€ 3 229 000



**European Commission
Research and Technological Development
Framework Programmes
funded projects on Road Safety
2001-2008**



FP5 Projects funded by DG TREN

Acronym	Domain	Total Cost (€)	EC Contributions (€)	Duration
ADVISORS	Vehicle: active safety	3 055 768	1 795 733	01/04/2000 - 30/11/2002
ECBOS	Accidentology	2 312 999	1 489 565	01/01/2000 - 01/06/2003
FID	Vehicle: passive safety	2 834 251	1 781 345	01/01/2000 - 01/06/2003
FORMAT	Road and tunnel infrastructure	4 524 690	2 000 272	01/02/2002 - 31/01/2005
GALLANT	GALileo for safety of Life Applications of driver assistance in road transport	–	–	29/12/2001 - 28/12/2003
HASTE	Vehicle: active safety	3 495 559	1 754 111	01/01/2002 - 31/12/2004
IMMORTAL	Fitness to drive	3 343 697	2 512 473	01/01/2002 - 30/06/2005
OSSA	Policy Assessment and Tools	2 658 011	1 499 036	01/03/2000 - 01/02/2003
PENDANT	Accidentology	872 816	823 505	01/01/2003 - 01/12/2005
PROSPER	Vehicle: active safety	3 234 655	1 841 767	01/01/2003 - 01/12/2005
RISER	Road and tunnel infrastructure	2 828 476	1 955 435	01/12/2002 - 01/12/2005
ROSEBUD	Policy Assessment and Tools	1 648 913	1 648 913	01/10/2002 - 01/09/2005
SAFET	Road and tunnel infrastructure	999 450	999 450	01/05/2003 - 01/03/2006
SAMARIS	Road and tunnel infrastructure	4 820 412	4 600 000	01/12/2002 - 30/11/2005
SENSOR	Road and tunnel infrastructure	2 008 062	1 204 568	01/01/2002 - 30/09/2004
SILVIA	Road and tunnel infrastructure	3 606 574	2 037 340	01/09/2002 - 31/08/2005
TRAINER	Training/education	3 576 981	2 274 258	01/04/2000 - 31/03/2003
TRAVEL GUIDE	Policy Assessment and Tools	2 281 017	1 549 939	01/04/2000 - 31/03/2003
VC COMPAT	Vehicle: passive safety	5 836 008	3 000 004	01/04/2000 - 31/03/2003
VERA2	Rules and enforcement	1 157 061	1 000 000	01/02/2003 - 31/07/2004
VIRTUAL	Vehicle: active safety	3 975 695	2 555 954	01/04/2000 - 31/03/2003
Total Cost		€ 59 071 095		
EC Contributions		€ 38 323 668 = 64.44 %		

56

ADVISORS

Action for advanced driver assistance and vehicle control system implementation, standardisation, optimum use of the road network and safety

Intelligent transport systems, especially systems that may assist the driver, are expected to increase road safety and road

capacity, and to attenuate environmental load in traffic. Appropriate advanced driver assistance systems (ADAS) will be selected from a problem-focussed angle and analysed in a multidisciplinary approach, in order to gain new policy insights. All the stages for a potential breakthrough of ADAS were investigated: the market conditions, the impacts on driving behaviour, road safety and environment, role of the public regulator, public acceptance, implementation strategies, etc. Assessment methodologies were developed and applied in order to deliver empirical evidence.



ECBOS

Enhanced coach and bus occupant safety

The main objectives of the ECBOS project were to make suggestions for improvements to ECE regulations and to propose new standards for the development of safer buses and coaches.

FID

Improved frontal impact protection through a world frontal impact dummy

The Improved Frontal Impact Protection through a World Frontal Impact Dummy (FID) project aimed to contribute to a further reduction of the amount of injuries and fatalities in frontal collisions. The most important achievement of the project was the introduction of an improved a frontal impact crash test dummy with realistic movements and injury indicating measurements for future automotive crash testing.

FORMAT

Fully Optimised road maintenance

The FORMAT project was designed to enhance the efficiency and safety of the European road network by providing the means to reduce the number, duration and size of road works for pavement maintenance purposes. This has the potential to improve safety of both road workers and road users at road maintenance sites. The research also focuses on reducing the associated delays and hence the costs for road users. Four topics key to road pavement maintenance formed the subject of this extensive research effort: maintenance techniques, cost benefit analysis, safety at work zones and pavement condition monitoring.

57

GALLANT

GALileo for safety of Life Applications of driver assistaNce in road Transport

The project studied the technical feasibility and evaluated the advantages obtained by the integration of the enhanced and certified Global Navigation Satellite System (GNSS/Galileo) with the on-board application for the Road Transport and Mobility. In particular within GALLANT project a set of ADAS (Advanced Driver Assistance Systems) application have been considered in terms of studies about gaps and critical scenarios and how the performances of Galileo localisation system could provide benefits. The integration of the appropriate and certified localisation system and enhanced digital road map with the actual ADAS architecture system provided add values in terms of improving of the technical performances and reliability.

HASTE

Human Machine interface And the Safety of Traffic in Europe

The project aimed at developing methodologies and guidelines for the assessment of In-Vehicle Information Systems (IVIS). This project contributed to the development of a valid, reliable and efficient tool to aid testing authorities in their safety evaluation of IVIS. With the advent of sophisticated

technology (mobile and portable) and the increase in the amount of time spent on the road, the car has become a potential home to many different types of systems. Such systems range from those which convey simple information to the driver (for example incident warnings) to those that require the driver to interact with a system in order to extract the required function (for example a route guidance system). There is an urgent need to develop thorough testing and diagnostic procedures for such systems in order to regulate their inclusion in the vehicle.



IMMORTAL

Impaired motorists, methods of roadside testing and assessment for licensing

IMMORTAL specified a research programme concerning the accident risk associated with different forms of driver impairment and the identification of 'tolerance levels' applied to licensing assessment and roadside impairment testing (including drug screening). Thus, IMMORTAL focused on two societal needs that both contribute to quality of life, namely mobility and safety. IMMORTAL provided added community value in terms of the generalisation of conclusions relevant to EU policy and standardisation of driver testing and assessment methods with respect to EEC directives.

OSSA

Open Framework for Simulation of Transport Strategies and Assessment

OSSA project has developed an advanced simulation environment that enables the integration of different types of simulation related tools in a common framework. This offers the traffic engineer a flexible solution to combine the outputs of the simulation tools with the added value given by the possibility of integrating them with the urban traffic management system installed in the city.

PENDANT

Pan-European Co-ordinated Accident and Injury Database

The PENDANT project was established to develop a new level of crash-injury data on a European basis in a consistent manner that had not been done before. The overall objective was to establish a European level data infrastructure, which could be used to gather and analyse accident information at a greater level of detail than previously seen. Among its objectives there was also the need to develop harmonised methods to evaluate collision severity in a way that could be implemented in a uniform manner by several investigating teams.

58

PROSPER

Project for Research on speed adaptation Policies on European roads

The overall project objective was to contribute to improved road traffic safety by giving answers to the following questions: How efficient is the use of road speed management methods based on information technology (ISA) in comparison with traditional means? How will the road users across Europe react to such development? What are suitable strategies for implementation and what obstacles have to be overcome?

RISER

Roadside Infrastructure for Safer European Roads

The RISER project has made a significant contribution to the understanding of single vehicle accidents in Europe. The RISER documents provide a European reference that can be used to improve road safety levels through the improvement of roadside infrastructure.



ROSEBUD

Road Safety and Environmental Benefit-Cost and Cost-Effectiveness Analysis for Use in Decision-Making

The proposal was intended to develop a method for cost-benefit analysis and cost-effectiveness analysis that can be used at all levels of government (European, national, regional, local) for the widest possible range of measures that are intended to improve road safety or the environment. The team of researchers developed guidelines and checklists for cost-benefit analysis and cost-effectiveness intended to make these techniques easily accessible and useful for decision-makers, but still consistent with theoretical principles they are based upon.

SAFE T

Safety in Tunnels Thematic Network

The 'Safety in Tunnels Thematic Network' (Safe T) aimed at developing comprehensive guidelines for pan European decision making on the safety of existing tunnels (primarily road but also rail) by investigating, identifying, assessing and proposing best practice solutions for preventing incidents and accidents in existing tunnels and mitigating their effects - for both people and goods - to ensure a high level of tunnel safety in Europe.

SAMARIS

Sustainable and Advanced Materials for Road Infrastructures

The societal needs that are specifically targeted here are to support EU policy on sustainable development, waste management and energy efficiency in road construction. The primary means is by encouraging a greater use of recycled components in pavement materials and by explicit consideration of environmental performance in the design. The second key objective is to prepare for the harmonisation of European approaches of material specification within the next generation of CEN standards. This involved moving from a recipe approach to a more general performance-based approach of the in-place products.

59

SENSOR

Secondary road network traffic management strategies

The SENSOR project produced two main exploitable results: the SENSOR Handbook and the SENSOR DSS (Decision Support System). The SENSOR Handbook was developed to provide a methodology for planning, implementing and managing road traffic data collection for secondary road networks. Parallel to the Handbook, the user is provided with the SENSOR DSS, a user-friendly interface for assessing the appropriate technology, the priority links to be equipped and the cost estimate of the planned traffic data acquisition system.

SILVIA

Sustainable Road Surfaces for Traffic Noise Control

This project aimed to provide decision-makers with a tool allowing them to rationally plan traffic noise control measures. The main product is a 'European Guidance Manual on the Utilisation of Low-Noise Road Surfacing' integrating low-noise surface with other traffic noise control measures including vehicle and tyre noise regulation, safety, traffic management and other noise abatement measures.



TRAINER

System for driver Training and Assessment using Interactive Evaluation tools and Reliable Methodologies

The project significantly contributed to the promotion of traffic safety in the EU. Apart from the reduction of accidents by novice drivers, they will be able to gain driving experience while using the multimedia tool and the driving simulators developed by TRAINER. The work towards identifying the needs of pre-and post-training of professional drivers (bus, truck, taxi, etc.), and the development of related training scenarios has also addressed EU initiatives on traffic safety.

TRAVEL GUIDE

Traveller and traffic information systems: guidelines for the enhancement of integrated information provision services

TRAVEL GUIDE developed guidelines concerning information provision by traffic information and traffic management system. The project investigated and assessed the needs of drivers in terms of content, presentation, availability, reliability, timing and hierarchy of the information provided, conduct relevant tests and suggest new methods in order to meet user needs and requirements raised by the development of the Trans-European Networks. New methods of information provision and presentation have been developed in order to increase information functionality and decrease the drivers' workload taking into account the specific requirements of special driver groups, including foreign drivers. The work improved the credibility and reliability of traffic information systems, enhance their effectiveness in relation to network utilisation, traffic safety and environmental protection and promote relevant market application.

60

VC COMPAT

Improvement of vehicle crash compatibility through the development of crash test procedures

The ultimate aim of the project was to develop crash test procedures, which once implemented in regulatory and/or consumer testing led to reduction in the casualties in car to car and car to heavy truck impacts.

VERA2

Cross-border enforcement of road traffic violations

VERA2 developed the concept of a cross border data exchange network for enforcement. The concept, known as eNFORCE, comprises a 'network' of agencies and organisations competent in carrying out the responsibilities associated with cross-border enforcement and a data exchange service.

VIRTUAL

Virtual reality systems for perceived ergonomic quality testing of driving task and design

VIRTUAL was aimed at developing innovative VE (Virtual Environment) systems for vehicle testing where the driver could be able to simulate real driving tasks at a high level of coherence with reality in terms of behaviour and perception.



FP5 Projects funded by DG RTD

Acronym	Title	Total Cost (€)	EC Contributions (€)	Duration
ADVANCE	Advanced Virtual Analysis of Crash Environments	2 414 000	1 350 000	01/02/2001 - 31/01/2004
CHILD	Advanced Methods For Improved Child Safety	4 506 640	2 985 754	01/09/2002 - 30/06/2006
CLARESCO	Car and Truck Lighting Analysis/Ratings and Evaluations for Safety	2 999 955	1 499 976	01/06/2002 - 31/05/2005
EUCLIDE	Enhanced Human-Machine Interface for On-Vehicle Integrated Driving Support System	3 849 067	2 349 624	01/03/2001 - 31/05/2004
EVPSN2	Enhanced vehicle passive network 2	972 026	900 000	01/02/2002 - 31/01/2004
HUMOS 2	Development of a Set of Human Models for Safety 2	4 476 462	3 199 966	01/09/2002 - 28/02/2006
IMPACT	Improved Failure Prediction for Advanced Crashworthiness of Transportation Vehicles	3 210 000	1 790 000	01/07/2000 - 30/09/2003
ROADSANSE	Road Awareness for Driving via a Strategy that Evaluates Numerous Systems	4 410 992	2 800 000	01/02/2001 - 30/06/2004
ROLLOVER	Improvement of Rollover Safety for Passenger Vehicles	3 470 805	2 100 000	01/07/2002 - 31/12/2005
SAFETRAM	Passive safety of tramway for Europe	3 235 237	1 395 411	01/07/2001 - 31/10/2004
SIBER	Side Impact Dummy Biomechanics and Experimental Research	3 160 000	1 730 000	01/02/2001 - 30/04/2004
UPTUN	Cost-effective, sustainable and innovative upgrading methods for fire safety in existing tunnels	11 925 764	6 200 477	01/09/2002 - 31/08/2006
VERTEC	Vehicle, road, tyre and electronic control systems interaction: increasing vehicle active safety by means of a fully integrated model for behaviour prediction in potentially dangerous situations	5 350 018	2 995 929	01/12/2002 - 30/11/2005
VITES	Virtual testing for Extended Vehicle Passive Safety	3 000 000	1 700 000	01/02/2001 - 31/01/2004
WHIPLASH II	Development of New Design and Test Methods for Whiplash Protection in Vehicle Collisions	3 600 000	2 100 000	01/03/2001 - 31/08/2004
Total Cost		€ 60 580 966		
EC Contributions			€ 35 097 137 = 57.93 %	



ADVANCE

Advanced Virtual Analysis of Crash Environments

The objective of the ADVANCE project was to enhance the current situation of passenger safety simulations, in order to identify sensitivities and reduce dispersion of the simulation responses, allowing for a cost-effective and predictive means of ensuring more reliable automotive design.

CHILD

Child injury led design

CHILD project results represent an invaluable source of real world crash injury data, based on real and virtual reconstructions of such cases, child-based simulation methods and tools,

and in-depth evaluation of child dummies. The project will also provide the manufacturers of restraint systems and airbags with much more accurate information which, in turn, should lead to rapid improvements in the safety of young passengers.

Whilst the outcomes of CHILD are directly ready for use, there is a need for future research activities which focus on children, taking the outputs of the CHILD research project as the basis.

CLARESCO

Car and Truck Lighting Analysis/Ratings and Evaluations for Safety

The CLARESCO project aimed at improving traffic safety and truck & car-drivers' comfort during night time driving. This has been achieved by analysing human perception and behaviour

in dynamic lighting situations using adaptive rear and front lighting technologies, traffic and environmental conditions. The work has been carried out through the use of innovative real-time simulation tools by specifying assessment procedures and evaluation methodologies that focus on safety and comfort. As a consequence, safety, ergonomics and comfort recommendations concerning new lighting technologies for truck and car have been presented.

62

EUCLIDE

Enhanced Human-Machine Interface for On-Vehicle Integrated Driving Support System

EUCLIDE developed a new reliable integrated driver assistance support system, to monitor the area ahead of the driver and provide an effective support especially in cases of night and adverse weather conditions. This system integrates the functionalities of radar and far infrared sensors resulting into a highly reliable and efficient system.

EVPSN2

Enhanced vehicle passive safety network 2

The aim of EVPSN2 was to enhance the level of road safety at affordable costs for the individual user and the European society. Building on the existing infrastructure created under

its predecessor EVPSN1, cooperation has been facilitated between the automotive industry, safety system suppliers, the research society, standard setting bodies and other stakeholders in the field of passive safety. The basis of EVPSN2 is the linkage between its 45 members established in 13 EU Member States in combination with a significant and growing number of clustered RTD projects in the field of passive safety creating integrated solutions.

HUMOS 2

Development of a Set of Human Models for Safety 2

The objective was the development of transport passive safety measures needs tools capable of predicting the injury risk of potential victims. Present tools (dummies) are limited in bio-fidelity and application. The objective of this project was to develop human body numerical models representing a large range of the European population and allowing an

accurate injury risk prediction. For that, an anthropometric database, a scaling tool and a positioning tool will be created to obtain the meshes of the 5th, 50th, 95th percentiles body in driving and standing positions. Data concerning muscle tone effect, soft tissues mechanical properties, internal organ interactions, injury mechanisms and whole body response to impact have been acquired. These biomechanical data are stored in a database to be used to develop and validate the models. After validation, the capability of the developed models for injury prediction can be assessed in realistic impact situations including different transport modes.



IMPACT

Improved Failure Prediction for Advanced Crashworthiness of Transportation Vehicles

Crashworthiness simulation has been a major factor that has enabled automotive manufacturers to achieve a 30-50% reduction in development time and costs over the past five years. Today, crashworthiness simulation is a mature and proven technology for the development of conventional 'ductile' steel automobiles. However, demand for greater weight saving and crashworthiness protection will only be possible using new design concepts and employing

lightweight materials that have limited ductility and a complex failure. The present crashworthiness codes cannot predict failure in materials or jointing systems that have raised serious uncertainties over their results. In order to avoid a return to a 'prototype based design' and to maintain the high level of safety achieved in recent years there is an urgent need to improve the failure prediction compatibilities of crashworthiness simulation codes. Advanced metals (high strength steel, aluminium and magnesium) and plastic trim that must absorb occupant impact have been used to develop the generic failure models. For jointing systems spot welds, rivets and welding have been studied and failure models validated. This proposal has developed validated design methodologies for the improved failure prediction of automotive structures under dynamic crash loading.

ROADSENSE

Road Awareness for Driving via a Strategy that Evaluates Numerous Systems

ROADSENSE produced a standard methodology for the assessing of the impact of new in-vehicle systems on driver performance. The project produced a sophisticated hardware/software system that can be adopted by automotive manufacturers and their suppliers to implement the ROADSENSE methodology. The ROADSENSE guidelines promote higher standards of systems performance in terms of safety, support and comfort and a consistent character to systems designed by Europe's automotive sector.

ROLLOVER

Improvement of Rollover Safety for Passenger Vehicles

The objective of this project was to assist European restraint and vehicle manufacturers to develop effective rollover systems in a cost efficient manner. The project has covered various types of rollover accidents including injury mechanisms and protection methods. The focus of the project was on occupant safety during rollover scenarios. The target vehicles are passenger cars, including SUV, MPV and minivans. The main results were an electronic rollover database and categorisation of rollover scenarios, information on occupant behaviour prior and during roll, best practice instruction for numerical and experimental test methods and a physical demonstrator on rollover occupant safety.

SAFETRAM

Passive safety for tramway for Europe

Tramway is an increasing accepted mode of urban passenger transport. Present levels of active safety are being achieved mainly through active systems such as signalling and high performance braking systems. However, accidents involving tramways continue to occur, which result in injuries to drivers,

passengers, pedestrians and road vehicle occupants. SAFETRAM addressed precisely the problem of tramway passive safety, which includes all structural and interior design rules that contribute to a safe environment for occupants during crash events. Passive safety has been applied currently and successfully in the automotive industry and, more recently, it is being implemented in trains. Addressing an entirely new European problem, SAFETRAM proposed to develop the correspondent rules for tramways, a passenger guided transport system operating in a complex environment of mixed traffic.



SIBER

Side Impact Dummy Biomechanics and Experimental Research

The side impact crash is now the key contributor to fatal and serious injuries in road accidents in Europe. The side impact directive marked an important step in improving car safety, but some areas of concern still exist. One is the specification of

the dummy used in the test procedure, which is not sufficiently able to address the risk at injury in complex side impact loading conditions, e.g. involving active protection systems. Therefore, the main objective was to provide a scientific basis and tools for enhancing and harmonising the side impact dummy, allowing automobile and restraint manufacturers to make safer cars against lower costs. The dummy developed has more humanlike behaviour more appropriate instrumentation and guidelines for future regulatory testing.

UPTUN

Cost-effective, sustainable and innovative upgrading methods for fire safety in existing tunnels

The UPTUN project aimed at the development and promotion of innovative, sustainable and low-cost measures to limit the probability and consequences of fires in existing tunnels and; the development and promotion of an integrated evaluating and upgrading procedure, incorporating the innovative measures, for existing tunnels to allow owners, stakeholders, designers and emergency teams to evaluate and upgrade the human and structural safety level.

VERTEC

Vehicle, road, tyre and electronic control systems interaction: increasing vehicle active safety by means of a fully integrated model for behaviour prediction in potentially dangerous situations

The project faced the problem of Land Transport Safety aiming to improve Vehicle Active Safety by developing an integrated model for the simulation of the full system road-tyre-vehicle-driver in the most dangerous situations (presence of water, ice, snow, etc.), with special focus on the representation of HGV (Heavy Goods Vehicle) and the most advanced Vehicle Electronic Control Systems. Such an integrated simulation environment made possible to detect and rank the most dangerous situations and to define guidelines for the faster development of new safer products.

64

VITES

Virtual testing for Extended Vehicle Passive Safety

In this project, the virtual testing process for crash safety applications is defined along three lines: procedures and guidelines defined to apply virtual testing as part of regulated

passive safety evaluations; modelling of the stochastic response of crash tests caused by the scatter in the components; range of protection extended to real life crash conditions by identification of gaps in the current regulations where occupants are not being adequately protected. Based on an extensive analysis of the effects of impact conditions and occupant characteristics, procedures have been defined to fill these gaps by virtual testing.

WHIPLASH II

Development of New Design and Test Methods for Whiplash Protection in Vehicle Collisions

Yearly more than 1 million European citizens suffer neck injuries from car collisions. These injuries often give rise to long lasting consequences for the individuals. It is expected that whiplash injuries can be reduced significantly by improvements in vehicle

design, in particular the seat/head restraint system and the restraint system. The technical and scientific objective of this project is to develop evaluation and design methods to minimise the incidence and risk of neck injuries in all important accident conditions and to take the rebound phase of the loading phase also into account. Main innovations in this project include: design guidelines related to the seat/head restraint system and the restraint system for improved whiplash protection; test methods and a new crash dummy to assess the whiplash protection offered by a vehicle; and computer models to support the industrial design process.



FP5 Projects Financed by the IST Programme

Acronym	Title	Total Cost (€)	EC funding (€)	Duration
ADASE II	Advanced Driver Assistance Systems in Europe	1 200 000	1 200 000	01/08/2001 - 31/07/2004
AIDER	Accident Information and Driver Emergency Rescue	4 935 409	2 573 546	01/09/2001 - 28/02/2005
APOLLO	Intelligent tyre for accident-free traffic	4 749 716	2 746 656	01/03/2002 - 31/05/2005
AWAKE	System for effective Assessment of driver vigilance and Warning According to traffic risk Estimation	6 343 581	3 307 712	01/09/2001 - 30/09/2004
CARSENSE	Sensing of Car Environment at Low Speed Driving	7 105 507	3 600 000	01/01/2000 - 31/12/2002
CARTALK 2000	Safe and Comfortable Driving based upon inter-vehicle communication	3 814 880	2 236 666	01/08/2001 - 31/07/2004
CHAMELEON	Pre-crash Application All Around The Vehicle	4 758 698	2 500 000	01/01/2000 - 31/03/2003
Chauffeur II	Promote Chauffeur II	9 999 999	4 999 998	01/01/2000 - 31/05/2003
COMUNICAR	COMmunication Multimedia UNit Inside CAR	4 374 117	2 399 976	01/01/2000 - 31/05/2003
DENSETRAFFIC	A Forward Looking Radar Sensor for Adaptive Cruise Control...	5 240 544	2 201 026	01/07/2001 - 31/03/2004
EDEL	Enhanced Driver's pErception in poor visibiLity	5 998 289	3 151 447	01/03/2002 - 31/07/2005
E-MERGE	Pan-European harmonisation of vehicle eMERGENCY call service chain	4 260 372	2 036 370	01/04/2002 - 31/03/2004
PROTECTOR	Preventive Safety For Un-protected Road User	4 497 740	2 467 571	01/01/2000 - 29/03/2003
RadarNet	Multifunctional Automotive Radar Network	7 991 875	4 496 673	01/01/2000 - 31/10/2004
RESPONSE 2	Advanced Driver Assistance Systems: From Introduction Scenarios towards a Code of Practice	1 561 913	1 256 593	01/09/2002 - 30/04/2004
RHYTHM	Real-time data Helps Yielding Traffic Handling Models	1 216 199	779 284	01/07/2001 - 31/12/2004
SAFETUNNEL	Innovative systems and frameworks for enhancing of traffic safety in road tunnels	4 441 933	2 223 048	01/09/2001 - 31/12/2004
SAVE-U	Sensors and system Architecture for Vulnerable road Users protection	8 015 235	4 007 616	01/03/2002 - 30/09/2005
SEE	Sight Effectiveness Enhancement	5 853 956	2 926 975	01/09/2002 - 31/12/2005
SIRTAKI	Safety Improvement in Road & rail Tunnels using Advanced ICT and Knowledge Intensive DSS	2 861 449	1 387 484	01/09/2001 - 31/12/2004
TOP TRIAL	Technologies for Optimising the Precision of MS-WIM of Road Transports to Improve Automatic Overload Control and European Procedures for Enforcement	1 119 378	798 738	01/10/2000 - 31/08/2002
VEESA	Vehicle e-safety architecture	634 319	539 170	01/01/2003 - 31/12/2003
Total Cost		€ 100 975 109		
EC Contributions		€ 53 836 549 = 53.30%		



ADASE II

Advanced Driver Assistance Systems in Europe

ADASE II was a thematic network that integrated international, national and regional activities in the field of Active Safety and Advances Driver Assistant Systems. Besides safety related aspects ADASE II offered the basis for improved interfaces to other transport modes and profitable additional applications and services such as smart travel advice, tele-commerce, in-car entertainment, mobile office support, etc.

AIDER

Accident Information and Driver Emergency Rescue

AIDER integrated in an innovative way state-of-the-art technology to reduce casualty consequences through a reliable reconstruction of the accident scenario. The AIDER concept is based on the direct cooperation between on-vehicle systems and rescue control centres to optimise the effectiveness and operative time of the rescue actions. The system will guarantee an automatic link between involved vehicles and rescue services as well as a support at decision level for accident management. Expertise from automotive and military field led to innovative project outcomes.

APOLLO

Intelligent tyre for accident-free traffic

66

The goal of APOLLO was to create an intelligent tyre for improving road traffic safety. The objectives were met by integrating innovative sensors into tyres for monitoring tyre condition, road condition and tyre-road interaction, developing new solutions for wireless communication between tyre and vehicle and a battery-less power-supply, constructing an

'intelligent' tyre system by integrating all electronic components. This enabled tyre data to be transmitted and converted to a usable form for vehicle systems, and making relevant tyre and road information available both to drivers and other users like infrastructure maintainers, vehicle and tyre suppliers, fleet operators and service providers.

The main outcome of the project was a novel, innovative and verified prototype of an intelligent tyre, which consists of a tyre, integrated sensor system, a wireless communication interface and a battery-free power supply.

AWAKE

System for effective Assessment of driver vigilance and Warning According to traffic risk Estimation

AWAKE project aimed to increase traffic safety by reducing the number and the consequences of traffic accidents caused by driver's hypo-vigilance, by developing a multi-sensor system such as an eyelid camera, a steering grip sensor, a lane tracker and other sensors monitoring vehicle-related parameters. Their signals will be integrated, through intelligent algorithms, allowing strong system personalisation to the specific traffic conditions as well to the driving pattern and physical characteristics of the individual driver.

CARSENSE

Sensing of Car Environment at Low Speed Driving

The project developed a sensing system for driver assistance systems with the aim of getting further ahead in the development of Advanced Driver Assistance Systems (ADAS) for complex situations, at the beginning at low speeds. This system is based on image processing technology, radar and laser. Sensor information is merged in order to achieve a good perception of the car environment. Based on experience from other projects, such as UDC or AC-ASSIST, the programme focused on definition of characteristic scenarios for low-speed driving, improvement of sensors for use according to the specifications, interface harmonisation and data bus definition, data fusion with visualisation of results, and a test vehicle.



CarTALK 2000

Safe and Comfortable Driving based upon inter-vehicle communication

CarTALK 2000 aimed at improving safety through assistance systems based on inter-vehicle communication. Maximum traffic safety can only be reached with a real-time dynamic network that supports cooperative driving. As cooperative driving is becoming one key issue, the realisation of interactive driver assistance systems represents a significant step towards the ultimate vision of an accident-free traffic.

CHAMELEON

Pre-crash Application All Around the Vehicle

Main objective of CHAMELEON was to support, to guide and to validate the development of a pre-crash sensorial system necessary for near impending crash detection all around the vehicle and in all scenarios. Several objectives could be

targeted to achieve this goal: the improvement of the already existing sensors performances, their robustness and their operative range extension; to study new strategies for the activation of the safety restraint system and of the safety requirements; a validation procedure in order to verify the system in a dedicated test site with the evaluation of social impact and productivity, including cost/benefits and investigation of legal and liability application; and the analysis of the integration of such system with other applications.

CHAUFFEUR II

Promote Chauffeur II

As a continuation of the CHAUFFEUR I project, CHAUFFEUR II aimed at further developing the tow-bar technology demonstrated in CHAUFFEUR I towards a system that can be transformed into a saleable product. The final result is a 'CHAUFFEUR Assistant' that supports the driver and allows him/her to follow another vehicle at a safe distance. Furthermore a fully operable truck platoon is to be realised. Typical Platoon manoeuvres will be presented in a test track environment.

67

COMUNICAR

Communication Multimedia UNit Inside CAR

COMUNICAR project developed two vehicle demonstrators (a city and an upper class car) integrating a new concept of multimedia HMI (Human Machine Interface) able to harmonise the messages oncoming both from the traditional on-vehicle information (e.g. tachometer, etc.) and the new functions for the

driving support (e.g. ADA systems such as Adaptive Cruise Control, Lateral and Longitudinal Control, Collision Warning, etc.; telematics services such as navigation, traffic and weather information, distance diagnostic, messaging, Internet, etc.; other information concerning comfort and entertainment such as CD and MP3 player, DAB, DVD, climate control, etc.). The project has developed an appropriate HMI able to manage all simultaneous input/output messages to improve drivers' comfort and safety by increasing drivers' alertness and reducing the workload during the driving task. The HMI design and development took into account ergonomic requirements and user needs.

DENSETRAFFIC

A Forward Looking Radar Sensor for Adaptive Cruise Control with Stop and Go and Cut-In Situations Capabilities implemented using MMIC technologies

The project's goal was to develop a forward-looking radar sensor for an Adaptive Cruise Control system with stop and go and cut-in situation capabilities. A single sensor with a seven-beam antenna provides improved angular coverage to overcome the limited angular coverage and close-range tracking capabilities of current radar sensors. This enables the implementation of stop and go modes and the acquisition of new targets in cut-in situations. The sensor's improved range resolution allows target tracking at close distances. These two features allow the implementation of stop and go modes for highway driving, and they have been developed to allow the future incorporation of stereoscopic vision technology for improved urban driving.



EDEL

Enhanced Driver's pErception in poor visibility

EDEL developed an advanced vision enhancement system for night vision application based on near infrared sensor, a novel illumination system and an adaptive human machine interface to reduce the number of road accidents in Europe. Even though the sensors offer images as intuitive as the ones of the visible range, human factor studies have highlighted that a mere video sequence of the enhanced scenario presented in front of the driver is not enough to promptly make him/her aware of danger, so the development of real time image processing algorithms is needed.

E-MERGE

Pan-European harmonisation of vehicle eMERGEncy call service chain

E-MERGE aimed to create an agreed technical, operational and business solution for the vehicle E-Call service chain via the creation of an extended E-Call 'X-112' and the enabling of pan-European service roaming between E-Call Service Centres. The solution is to be validated in vehicles from six European vehicle manufactures on five European sites to ensure that the vehicle E-Call services are available when travelling anywhere in Europe and that current problems with interoperability and language are resolved.

PROTECTOR

Preventive Safety For Un-protected Road User

68

The general objective was the improvement of safety of vulnerable citizens (pedestrian, cyclists, motorcyclists) in urban and rural areas, based on the interaction of enhanced autonomous on-vehicle sensors (based on laser, microwave and

computer vision technologies) with cooperative means carried by the vulnerable road users (transponders, microwave/optical reflectors, etc.). The development and validation of the autonomous and/or cooperative detection means, in real environment or in an ad hoc established test site for the most critical scenarios were the operative objective of the project, both at automobile and commercial vehicle level. Complementing objectives were the evaluation of socio/economic impacts and actions for dissemination of the potential products defined in the project.

RADARNET

Multifunctional Automotive Radar Network

This project aimed at three main objectives. First, a new 77 GHz GaAs MMIC based chipset for FMCW radar systems was developed. Second, a multifunctional radar network was created, consisting of precisely synchronised near-distance and far-distance sensors developed based on the new chipset. Third, prototypes of such radar networks to be integrated into several experimental cars to prepare the realisation of following new safety and comfort systems: urban collision avoidance, collision warning, airbag pre-crash warning, stop and go functionality, and parking aid.

RESPONSE 2

Advanced Driver Assistance Systems: From Introduction Scenarios towards a Code of Practice for Development and Testing

RESPONSE 2 worked towards: a clearer definition of the concepts of 'reasonable safety' and the 'duty of care', which will (legally) protect the manufacturer and the political decision-makers by developing methods for gaining a deeper understanding of the microscopic and macroscopic risks and opportunities of ADAS; and the provision of a basis for the translation of such fundamental considerations into a generally accepted 'Code of Practice' for the technical and user-centred development and testing of ADAS-systems.



RHYTHM

Real-time data Helps Yielding Traffic Handling Models

Video sensors for road traffic have proven advantages over loop detectors for various applications beyond the mere measurement of traffic variables, e.g. for incident detection. For the further deployment of traffic sensors, it is important to

test their efficiency for specific surveillance and control tasks of practical importance, and to compare their performance with that of loop-based detectors. The use and full exploitation of video-based information calls for suitable modifications or even complete re-design of available loop-based surveillance or control algorithms along with field application, demonstration, and comparative evaluation. The innovation of RHYTHM lies exactly in this design and field evaluation of such algorithms while comparing results of both detection technologies, with the overall aim to improve quality of service.

SAFE TUNNEL

Innovative systems and frameworks for enhancing of traffic safety in road tunnels

SAFE TUNNEL's main objective was to contribute to reduce the overall number of accidents inside road tunnels through preventive safety measures. Basic ideas were to increase the knowledge of the vehicle status in order to avoid the access into the tunnel to those vehicles with detected or imminent on-board anomalies and to introduce measures to achieve the control of the speed of the vehicles.

SAVE-U

Sensor and system Architecture for vulnerable road users protection

The main objective of SAVE-U is to develop an integrated system for the active protection of UPR (unprotected road users) such as pedestrians and cyclists.

The project had three different stages:

- detection of the UPR at sufficient distance (up to 30 meters in urban environment) covering the largest range of scenarios;
- definition and implementation of driver warning and vehicle control strategies in order to avoid a crash;
- definition of strategies for active protection of UPR in case the crash cannot be avoided.

69

SEE

Sight Effectiveness Enhancement

Safety of transportation is essential to the citizens' quality of life and to the development of European industry. Low visibility during night time or under bad weather conditions is one of the main reasons of road accidents and air traffic crashes. Infrared sensors are means that could help drivers or pilots to overpass human eyes limitation. Up to now these

sensor technologies were not capable of good performances (readability) under all weather conditions and it was impossible to demonstrate that these means would not lead to misleading information. It was the goal of the SEE project to address these two limitations by: developing two IR cameras (Long and Short Wavelengths Infrared Sensor), based on last un-cooled technology, and merging the two information to obtain at the same time readable and reliable images; and developing a validated simulation of the two IR images in order to assess the human performances, based on the state of the art of human factors methodologies.

SIRTAKI

Safety Improvement in Road & rail Tunnels using Advanced ICT and Knowledge Intensive DSS

SIRTAKI contributed to improving tunnel safety through the development and assessment of an advanced tunnel management system that specifically tackles safety issues and emergencies and the integration within the overall network

management. The resulting benefits are measured in technical, social and economic terms, in particular by: improving safety in tunnels; reducing the risk of accidents in tunnels and the severity of those taking place; reducing stress in operators and citizens in front of an emergency; managing tunnels and the rest of the transport network in a coordinated way and therefore improving the performance of the available transport infrastructures; and performing the integrated management of not only emergencies, but also other special situations -e.g. congestion, maintenance works, etc.



TOP TRIAL

Technologies for Optimising the Precision of MS-WIM of Road Transports to Improve Automatic Overload Control and European Procedures for Enforcement

The global objective of TOP TRIAL was to improve procedures and technologies for higher traffic safety and road protection by testing them for enforcement of overloaded freight transport. This project aimed to achieve greater accuracy of the WIM systems in a trial allowing investigations of staggered multi sensor arrays combining two promising technologies and adapted optimisation algorithms in a new approach. The two main goals of the project were: improving the accuracy of weight measurement of truck loads to cover future regulation aspects; and recommending future European standards as basis for enforcement.

VEESA

Vehicle e-safety architecture

To improve traffic safety, future cars and vehicles will be equipped with integrated safety systems, which assist the driver in dangerous traffic situations. Today integrated safety systems are developed by each manufacturer (OEM) on its specific framework for software and communication interfaces,

and related tool-environments. For system suppliers this means that they are dealing with a wide range of incompatible OEM-specific solutions, hindering the wide-spread introduction of integrated safety functions. Sharing aspects of a common architecture will facilitate the introduction and the dissemination of future integrated safety functions. The VEESA study analysed existing certification methods and processes regarding their suitability in respect of future safety and reliability requirements. A workplan on how to achieve a harmonised system certification has been defined.

70

FP6 Projects funded by DG TREN

Acronym	Domain	Total Cost (€)	EC Contributions (€)	Duration
DRUID	Driving under influence	23 810 000	18 930 000	15/10/2006 - 14/10/2010
IN SAFETY	Road and tunnel infrastructure	5 570 000	2 940 000	01/01/2005 - 31/12/2007
PEPPER	Rules and enforcement	3 870 000	2 090 000	01/03/2006 - 31/08/2008
RANKERS	Road and tunnel infrastructure	4 260 000	2 560 000	01/02/2005 - 31/01/2008
RIPCORD-ISEREST	Road and tunnel infrastructure	3 420 000	2 600 000	01/01/2005 - 31/12/2007
SAFETY NET	Accidentology	19 470 000	9 000 000	01/12/2004 - 01/12/2008
Total Cost		€ 60 400 000		
EC Contributions		€ 38 120 000 = 63.11 %		

DRUID

Driving under influence, drugs, alcohol and medicines

One of the major causes of road accidents is impaired driving due to the consumption of psychoactive substances such as alcohol, drugs and certain medicines. Most efforts have concentrated on drink-driving, and although this remains a problem which requires further efforts, substantial progress has been made in reducing drink-driving in the EU in recent years. The objective of DRUID is to give scientific support to EU Transport Policy to reach road safety targets by establishing guidelines and measures to combat impaired driving.



IN SAFETY

Infrastructure and safety

Road safety engineering measures may sensibly reduce casualties. However, the rather high cost of traditional infrastructure construction/adaptations is a prohibiting factor. The combination of new technologies with existing infrastructure may lead to much more cost-efficient solutions. IN SAFETY project aims to use intelligent, intuitive and cost-efficient combinations of new technologies and traditional infrastructure best practice applications, in order to enhance the forgiving and self-explanatory nature of roads.

PEPPER

Police enforcement policy and programmes on European roads

The project PEPPER aimed to contribute to the efficiency and effectiveness of traffic law enforcement on EU roads. While the focus of the project was on traffic policing, the whole enforcement chain was examined from policy choices about the role of police in road safety, through traffic law making, traffic police enforcement practices and the handling of driving offences by the courts. The project targeted the enforcement of speeding, drink-driving and use of seat belts.

RANKERS

Ranking for European Road Safety

The objective of RANKERS was to develop comprehensive and practical guidelines for road infrastructure safety to enable optimal cost-effective decisions by road authorities and road operators in their efforts to eradicate dangerous road sections and promote sustainable roads. The project's tangible output includes an index used for assessing and monitoring road safety and a catalogue of remedial measures ranked according to their efficiency. Both measures will contribute to the emergence of a European culture of safe road engineering.

71

RIPCORD-ISEREST

Road Infrastructure Safety Protection

The fundamental objective of RIPCORD-ISEREST was to develop best practice guidelines based upon the current research results for:

- Road Safety Impact Assessment tools and Accident Prediction Models
- Road Design and Road Environment.
- Road Safety Audit.
- Road Safety Inspection.
- Black Spot Management and Safety Analysis of Road Networks.

With these tools, RIPCORD-ISEREST intended to give scientific support to practitioners concerned with road design and traffic safety in Europe.

SAFETY NET

Safety Net contributed to lay down the first bricks of the Road Safety Observatory, which will enable the Commission to monitor progress towards targets, identify best practise, and ensure that new regulatory and other safety actions will result in the maximum casualty reduction. All data assembled or gathered within the project are available over the web to the entire road safety community.



FP6 Projects financed by DG RTD

Acronym	Title	Total Cost (€)	EC Contributions (€)	Duration
APROSYS	Advanced Protection Systems	29 791 236	18 000 000	01/04/2004 - 31/03/2009
APSN	Network of Excellence on Advanced Passive Safety	3 800 000	3 800 000	01/04/2004 - 31/08/2008
Heavy-route	Intelligent Route Guidance for Heavy Vehicles	3 280 803	1 700 000	01/09/2006 - 28/02/2009
PISa	Powered two-wheeler Integrated Safety	2 943 730	1 850 000	01/06/2006 - 31/11/2009
SIM	Safety in Motion	4 036 404	2 199 939	01/09/2006 - 31/08/2009
TRAIN-ALL	Integrated System for driver TRaining and Assessment using Interactive education tools and New training curricula for ALL modes of road transport	3 702 408	2 300 000	01/11/2006 - 31/10/2009
Total Cost		€ 47 554 581		
EC Contributions		€ 29 849 939 = 62.76 %		

72

APROSYS

Advanced protection systems

The Integrated Project on Advanced Protective Systems (APROSYS) focused on scientific and technological development in the field of passive safety (crash safety).

The field of passive safety concerns in particular human biomechanics (injury mechanisms and criteria), vehicle and infrastructure crashworthiness and occupant and road user protection systems. The general objective of APROSYS was the development and introduction of critical technologies that could improve passive safety for all European road users in all relevant accident types and accident severities.

APSN

Network of Excellence on Advanced Passive Safety

Following the mobilisation of critical R&D mass on vehicle passive safety in EU Thematic Network projects like PSN and EVPSN2, APSN aimed at a durable integrated European vehicle passive safety research and implementation programme, and the creation of a virtual institute (VI).

Heavy-Route

Intelligent Route Guidance for Heavy Vehicles

The objective of Heavy-Route was to develop an advanced route guidance system for deriving the safest and most cost-effective routes for road freight transport throughout Europe. The system takes into account road user needs, vehicle operating and environmental costs, but also maintenance costs due to the deterioration of roads and bridges.

PISA

Powered Two-wheeler Integrated Safety

Pisa focus is on drivers and passengers of powered two-wheelers (PTWs) motorcycles and mopeds.

The objective for the PISa project is to combine sensors and actuators to:

- avoid 50 % of accidents where a collision was not inevitable;
- reduce the impact speed, and hence reduce the injury severity by one MAIS integer for 50 % of accidents where a collision was unavoidable;
- prevent 50 % of the single vehicle loss-of-control accidents.



SIM

Safety in Motion

SIM project deals with the development of an innovative concept PTW vehicle with new safety devices that will result in a decrease in the number of powered two-wheelers (PTW) accidents and related consequences for riders. An integrated (matrix) approach to solve safety issues for PTWs has been implemented.

TRAIN ALL

Integrated System for driver TRaining and Assessment using Interactive education tools and New training curricula for ALL modes of road transport

TRAIN ALL will develop a computer-based training system for the training and assessment of different land-based driver cohorts (motorcycle riders, novices, emergency drivers and truck drivers) that integrates multimedia software, driving simulator, virtual driving simulator and onboard vehicle sensors into a single modular platform.

FP6 Infrastructure Projects funded by DG RTD

Acronym	Title	Total Cost (€)	EC Contributions (€)	Duration
ARCHES	Assessment and Rehabilitation of Central European Highway Structures	2 942 413	1 799 930	01/09/2006 - 31/08/2009
CERTAIN	Central European Research in Road Infrastructure	750 000	750 000	01/06/2006 - 31/05/2010
Ecolanes	Economical and Sustainable Pavement Infrastructure for Surface Transport	2 477 223	1 700 000	01/10/2006 - 30/09/2009
HP FUTURE-Bridge	High-Performance (Cost Competitive, Long Life and Low Maintenance) Composite Bridges for Rapid Infrastructure Renewal	2 939 975	1 499 495	01/10/2006 - 30/09/2009
INTRO	Intelligent roads	3 496 456	1 999 020	01/03/2005 - 29/02/2008
ITARI	Integrated Tyre and Road Interaction	2 115 787	1 700 000	01/02/2004 - 31/01/2007
MISS	Monitor Integrated Safety Systems	2 989 046	1 499 977	01/01/2005 - 31/12/2006
NR2C	New Road Construction Concept	4 773 992	2 000 000	01/12/2003 - 30/11/2007
REACT	Realising Enhanced Safety and Efficiency in European Road Transport	3 675 513	1 999 955	01/01/2005 - 31/12/2006
SPENS	Sustainable Pavements for EU New MS	2 471 150	1 299 443	01/09/2006 - 31/08/2009
Total Cost		€ 28 631 555		
EC Contributions		€ 16 247 820 = 63.24 %		



Infrastructures Research in FP6

FP6 Sustainable Surface Transport stated that 'Research will focus on increasing the capacity of existing and new transport infrastructure by maximising safety and well being of drivers, passengers, crew and pedestrians. The aim will be the development of strategies, system and technologies to attain optimal operational performance of vehicles and their supporting infrastructure, seeking to halve the number of transport fatalities by 2010 and increasing capacity by 15%'.

Therefore, a number of projects have been launched under the theme of safe infrastructure, focussing mainly on the new Member States, where the enhancement of the road transport infrastructure has been – and still is – one of the most urgent priorities towards overall country development, as its role has been proven to be central and is the one of the most relevant for regional and local authorities.

Following the Lisbon Objectives and the integration concept of the FP (ERA), research has to contribute to innovation and delivering results exploitable for the benefit of society.

Research is therefore aimed at the creation of a smart, safe and accessible road network.

Roads will become 'self-explaining', easy to understand and 'forgiving' in order to minimise road users' mistakes and to reduce accidents, fatalities and injuries. Self-explaining, forgiving infrastructure equipped with appropriate advanced furniture and signalling can have a higher pro-active role in both primary and secondary safety and can contribute to reach the desired security level.

ARCHES

Assessment and Rehabilitation of Central European Highway Structures

The overall goal of the proposed project is to develop ways of raising the standard of highway structures in the new Member States and Central and Eastern European Countries to the level necessary for their full economic integration into the EU and for the future development of the Union.

74

CERTAIN

Central European Research in Road Infrastructure

CERTAIN is a Coordination Action that aims at facilitating integration of the new Member States and other Central European countries into the established research and development community of the EU. The project will provide the clustering environment for EC research projects on road infrastructure.

Ecolanes

Economical and Sustainable Pavement Infrastructure for Surface Transport

Infrastructure for surface transport will be developed using slip forming techniques based on existing asphalt laying equipment and steel fibre reinforced concrete. The new construction concept will reduce construction costs, time and energy consumption, minimise maintenance and make use of waste materials.

HP FUTURE-Bridge

High-Performance (Cost Competitive, Long Life and Low Maintenance) Composite Bridges for Rapid Infrastructure Renewal

The overall objective of the project is the development of a high-performance and cost-effective construction concept for bridges based on the application of fibre-reinforced polymers (FRP) for rapid infrastructure renewal in the new Member States (NMS) and beyond.



INTRO

Intelligent roads

An innovative integration of existing sensor and communication technologies with road infrastructure is one way of reaching the twin goals of increased safety and increased capacity. For a relatively small cost, significant 'added value' can be obtained from existing infrastructure, achieving a cost-effective solution to the problem.

ITARI

Integrated Tyre and Road Interaction

Road traffic is steadily increasing. The objective was to provide tools to investigate new road surfaces, which will lower noise emission, lower fuel consumption and meet safety requirements. It will demonstrate the implementation of virtually prototyped road surfaces.

MISS

Monitor Integrated Safety Systems

MISS aimed to develop an innovative platform to dynamically sense and predict natural and infrastructure conditions. This project wanted to increase the safety of both citizens and operators by enabling a just-in-time intelligent computation of an open dynamic road surveillance network.

NR2C

New Road Construction Concept

NR2C has developed long-term perspectives, concrete pilot projects and research recommendations, linking long-term visions and ideas to short-term actions. 'Dialogue and

cooperation', 'Creativity and innovation' and 'Short-term and long-term' are the main ingredients of this project.

Some specific innovations developed in NR2C are classified in accordance to their contribution to one of the four NR2C concepts - human, reliable, green, safe and smart infrastructure, previously identified.

75

REACT

Realising Enhanced Safety and Efficiency in European Road Transport

The REACT project represents a breakthrough towards the long-term vision of significantly reducing traffic deaths and improving the transport infrastructure's efficiency. REACT will sense natural and infrastructure conditions within and near each equipped vehicle. By using mobile vehicle sensors, REACT will ultimately cover all roads, and not just interurban routes where existing traffic management systems tend to be located.

SPENS

Sustainable Pavements for EU New Member States

The aim of the project is to develop appropriate tools and procedures for the rapid rehabilitation of road pavements using materials that would:

- behave satisfactorily in a typical climate;
- have an acceptable environmental impact;
- be easy to incorporate within existing technologies;
- be cost-effective and easy to maintain.



FP6 Projects funded by IST Programme

Acronym	Title	Total Cost (€)	EC Contributions (€)	Duration
AIDE	Adaptive Integrated Driver-Vehicle Interface	12 610 000	7 300 000	01/03/2004 - 29/02/2008
ATESST	Advancing Traffic Efficiency and Safety through Software Technology	3 090 000	2 060 000	01/01/2006 - 31/05/2008
COM2REACT	COoperative CoMmunication System TO Realise Enhanced Safety And Efficiency In European Road Transport	5 590 000	3 000 000	01/01/2006 - 31/12/2007
COMeSAFETY	Communications for eSafety	1 550 000	1 100 000	01/01/2006 - 31/12/2009
COOPERS	Cooperative Systems for Intelligent Road Safety	16 780 000	9 800 000	01/02/2006 - 31/01/2010
COVER	Semantic driven cooperative vehicle infrastructure systems for advanced eSafety applications	4 140 000	2 240 000	01/03/2006 - 28/02/2008
CVIS	Cooperative Vehicle-Infrastructure Systems	41 170 000	21 910 000	01/03/2006 - 31/01/2010
CYBERCARS2	Close Communications for Cooperation between Cybercars	4 040 000	2 070 000	01/01/2006 - 31/12/2008
EASIS	Electronic Architecture and System Engineering for Integrated Safety Systems	9 610 000	5 000 000	01/01/2004 - 31/03/2007
eIMPACT	Socio-economic Impact Assessment of stand-alone and co-operative intelligent vehicle safety systems (IVSS) in Europe	2 520 000	1 600 000	01/01/2004 - 30/06/2006
eSAFETY SUPPORT	–	2 970 000	1 970 000	01/01/2006 - 03/12/2008
eSCOPE	eSafety Observatory	600 000	600 000	18/12/2003 - 31/12/2005
EU-INDIA	Cooperation between Europe and India on eSafety	316 458	239 882	01/12/2005 - 31/05/2007
EURAMP	European Ramp Metering Project	2 830 000	2 010 000	01/04/2004 - 31/05/2007
FEEDMAP	Technical and commercial feasibility assessment of map data feedback loops applied to the ActMAP framework	3 620 000	1 960 000	01/06/2006 - 31/08/2008
FRICTION	On-board Measurement of Friction and Road Slipperiness to Enhance the Performance of Integrated Cooperative Safety Systems	4 300 000	2 600 000	01/01/2006 - 31/12/2008
GOODROUTE	Dangerous GOODS Transportation ROUTing, Monitoring and Enforcement	4 890 000	2 800 000	01/01/2006 - 31/12/2009
GST	A Global System for Telematics enabling on-line safety services	22 130 000	11 100 000	01/03/2004 - 31/03/2007



Acronym	Title	Total Cost (€)	EC Contributions (€)	Duration
HIGHWAY	Breakthrough Intelligent maps & Geographic tools for the context aware delivery of e-safety & added-value services	3 020 000	1 620 000	01/04/2004 - 31/12/2006
HUMANIST	Human Centred Design for Information Society Technology	5 360 000	5 360 000	01/04/2004 - 29/02/2008
I-WAY	Intelligent co-operative system in cars for road safety	4 590 000	2 600 000	01/02/2006 - 31/01/2009
MORYNE	Enhancement of public transport efficiency through the use of mobile sensor networks	3 830 000	2 000 000	01/02/2004 - 31/03/2008
PREVENT	Preventive and Active Safety Applications	54 170 000	29 800 000	01/02/2004 - 31/03/2008
REPOSIT	Relative Positioning for collision avoidance systems	947 296	543 098	01/01/2006 - 31/12/2007
SAFESPOT	Co-operative Systems for Road Safety 'Smart Vehicles on Smart Roads'	37 630 000	20 590 000	01/02/2006 - 31/01/2010
SAFETEL	Safe Electromagnetic Telecommunication on Vehicle	1 590 000	949 940	01/10/2006 - 30/09/2008
SAFETY TECHNOPRO	Training System on New Safety Technologies for Road Transport Addressed to Professional Bodies of the Automotive Sector	620 360	620 360	01/10/2006 - 30/09/2008
SAVECOM	Secure Vehicle Communication	4 540 000	3 000 000	01/01/2006 - 31/12/2008
SPARC	Secure Propulsion using Advanced Redundant Control	12 600 000	6 500 000	01/01/2004 - 31/07/2007
TRACE	Traffic Accident Causation in Europe	4 040 000	2 950 000	01/01/2006 - 30/06/2008
TRACKSS	Technologies for Road Advanced Cooperative Knowledge Sharing Sensors	4 370 000	2 500 000	01/01/2006 - 31/12/2008
WATCH-OVER	Vehicle-to-vulnerable road user cooperative communication	5 910 000	3 320 000	01/01/2006 - 31/12/2009
Total Cost		€ 285 977 114		
EC Contributions		€ 161 713 280 = 56.54%		

AIDE

Adaptive Integrated Driver-vehicle Interface

The general objective of the AIDE was to generate the knowledge and develop methodologies and human-machine interface technologies required for safe and efficient integration of ADAS, MS and nomad devices into the driving environment.

Specifically, it has designed, developed and validated a generic Adaptive Integrated Driver-vehicle Interface (AIDE) that employs innovative concepts and technologies in order to: maximise the efficiency, and hence the safety benefits, of advanced driver assistance systems; minimise the level of workload and distraction imposed by in-vehicle information systems and nomad devices; enable the potential benefits of new in-vehicle technologies and nomad devices in terms of mobility and comfort, without compromising safety.



ATESST

Advancing Traffic Efficiency and Safety through Software Technology

ATESST addressed system modelling techniques and delivered an automotive architecture description language, ADL. Focus was on achieving an adequate information structure for all engineering information involved in automotive software development.

COM2REACT

Cooperative communication system to realise enhanced safety and efficiency in European road transport

Effective large-scale control of traffic, geared to address both efficiency and safety, requires a system incorporating a hierarchy of control levels.

COM2REACT's overall objective was to establish the feasibility of such a three-layer, scalable, cooperative system. Its implementation will involve the deployment of two two-way communication systems: vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I). This structure facilitated significant improvement in the flow of information acquired by moving vehicles and in its quality and reliability, thereby enhancing road efficiency and traffic safety on urban, intercity arterials and rural roads.

COMeSafety

Communications for eSafety

The COMeSafety project supports the eSafety Forum with respect to all issues related to vehicle-to-vehicle and vehicle-to-infrastructure communications as the basis for cooperative

intelligent road transport systems. COMeSafety provides a platform for both the exchange of information and the presentation of results. For European and worldwide harmonisation, liaisons are established and workshops are organised to bring together the eSafety forum and all stakeholders. COMeSafety provides an open integrating platform, aiming for the interests of all public and private stakeholders to be represented.

78

COOPERS

Cooperative Systems for Intelligent Road Safety

COOPERS Vision provides vehicles and drivers with real time individual/local situation based, safety related traffic status and infrastructure status information distributed via dedicated Infrastructure to Vehicle communication (I2V). This approach extends the concepts of vehicle autonomous systems and vehicle-to-vehicle communication (V2V) with tactical and strategic traffic information only be provided by the infrastructure operator in real time.

COVER

Semantic driven cooperative vehicle infrastructure systems for advanced eSafety applications

The main aim of the COVER project was to foster the creation of the next generation intelligent cooperative systems that will make road transport more efficient and effective, safer and

more environmentally friendly. The project main focus was on the cooperation between the infrastructure and vehicles in order to support or enable the driver and/or the vehicle to perform a certain traffic related actions. In particular, intelligent speed adaptation, including static, temporary and dynamic speed limits, advanced cruise-assist highway systems that uses sensors to detect dangers that drivers and on-board sensors are unable to detect, truck platooning, i.e. the coordination of traffic management systems and trucks in order to safety and efficiently manage queues, congestions, etc.

CVIS

Cooperative vehicle-infrastructure systems

CVIS will develop and integrate the essential basic and enabling technologies such as a multi-channel communications and network platform readily adaptable for both vehicle and roadside, a highly accurate positioning and local map module and an open software environment for applications. Combined



into a 'CVIS platform' unit, these components will allow a vehicle to share urgent information with nearby vehicles and to dialogue with both the immediate roadside infrastructure and with infrastructure operators and service providers. New tools

for 'cooperative monitoring' will both deliver real-time traffic information over the entire road network, and augment the information available to local control functions such as intersection controllers.

CYBERCARS 2

Close Communications for Cooperation between Cybercars

This research proposal is driven by the vision that, in the not too distant future, Cybernetic Transport Systems (CTS) based on fully automated urban vehicles will be seen on city roads. One of the objectives of the project was to develop communication architecture for the long term which is interoperable and fully compliant with existing or future standards. The CYBERCARS 2 project supports the eSafety initiative for the development, deployment and use of Intelligent Integrated Safety Systems in Europe.

EASIS

Electronic Architecture and System Engineering for Integrated Safety Systems

For the realisation of an Integrated Safety Systems a powerful and highly dependable in-vehicle electronic architecture and an appropriate development support is mandatory. These elements, which are not competitive relevant for OEMs and suppliers, should be standardised to achieve improved system quality at shorter development time and lower system costs.

The goal of the EASIS project is to define and develop enabling technologies:

- a platform for software-based functionality in vehicle electronic systems providing common services upon which future applications can be built;
- a vehicle on-board electronic hardware infrastructure which supports the requirements of integrated safety systems in a cost effective manner;
- methods and techniques for handling critical dependability-related parts of the development lifecycle to be analysed, adapted, extended and defined;
- an engineering process and a suitable tool chain, enabling the application of integrated safety systems.

79

eIMPACT

Socio-economic Impact Assessment of stand-alone and cooperative intelligent vehicle safety systems (IVSS) in Europe

Intelligent Vehicle Safety Systems (IVSS) possess great potential to increase the safety and effectiveness of the transport system. Socio-economic assessment is an important force for acceptance and implementation of the applications.

The main objectives of eIMPACT were:

- to carry out a socio-economic impact assessment of IVSS, based on a description of relevant IVSS, and their expected impacts on traffic safety and efficiency;
- to provide perspectives on the market introduction of IVSS, integrating the input from the impact analysis, policy options and stakeholder roles.

The socio-economic impact assessment had a central role in this project.

eSAFETY SUPPORT

eSafety Support was Specific Support Action that strengthened the activities and results generated from the eSafety initiative through preparation of future actions, support to policy, and through dissemination of results to all stakeholders.

eSafety Support built up a knowledge base and provided a synthetic overview and executive 'state-of-work' in key thematic areas covered by the eSafety initiative, for which the eSafety Support secretariat is a key contact point.



eSCOPE

eSafety Observatory

eSCOPE will monitor and stimulate eSafety Forum progress and activities, and will become an easily accessible and up-to-date resource for information on the priority eSafety topics.

eSCOPE comprised three main activities aimed at mobilising the commitment of the eSafety community:

- monitoring progress on implementation of the 28 eSafety priority recommendations and of the eSafety 'Road Maps' to be agreed;
- overview and reporting of European emerging results on eSafety priority topics;
- promotion and dissemination.

EU-INDIA

Cooperation between Europe and India on eSafety

The main objective of EU-India was to improve road safety in India through a close cooperation between European and Indian stakeholders defining key issues for the deployment of intelligent transport systems and services and in particular intelligent vehicle safety systems (eSafety) in India.

EURAMP

European Ramp Metering Project

EURAMP is a comprehensive, up-to-date, representative, collective European action focused on ramp metering control measures in European motorways in the aim of improving

safety and increasing efficiency of traffic flow. Daily recurrent and non-recurrent congestions on European motorways lead to a substantial degradation of the expensive motorway infrastructure, reduced traffic safety and excessive environmental pollution. Ramp metering is the most direct and effective control measure towards an optimal, orderly and safe utilisation of the motorway infrastructure.

FEEDMAP

Technical and commercial feasibility assessment of map data feedback loops applied to the ActMAP framework

The FeedMAP project aimed to build a cooperative map feedback and updating framework improving the cooperation between data owners and data users. This framework contributed to an improved transport efficiency and increased road safety by creating a sustainable source of map updates at a reduced cost for navigation and Advanced Driver Assistance Systems (ADAS) applications.

The objective of the project was to assess the technical and economic feasibility of map data correction by providing a map data feedback loop applied to a map data updating framework. The cooperative environment is based on the collection of map data from in-vehicle sensors compared to the map database. Simple algorithms allow the detection of map data anomalies and send deviation reports to the FeedMAP service centres (FSC). The statistical analysis of aggregated deviation reports at the FSC will produce potential map updates with a measurement on reliability and accuracy.

FRICION

On-board Measurement of Friction and Road Slipperiness to Enhance the Performance of Integrated Cooperative Safety Systems

The objective of the FRICION project was to create an on-board system for estimating friction and road slipperiness to enhance the performance of integrated and cooperative safety systems like vehicle-to-vehicle communication, and driver information.

The project did not develop new sensors, but uses existing ones in a novel way. The aim was a solution for real-time estimation of the tyre-road friction using a sensor cluster in a moving vehicle.



GOODROUTE

Dangerous GOODS Transportation ROUTing, Monitoring and Enforcement

GOOD ROUTE aims to develop a cooperative system for dangerous goods vehicles routing, monitoring, re-routing (in case of need), enforcement and driver support, based upon dynamic, real time data, in order to minimise the Societal Risks related to their movements, whereas still generating the most cost efficient solution for all actors involved in their logistic chain.

GST

A Global System for Telematics enabling on-line safety services

GST is a major initiative mobilising more than 50 key stakeholders in the European telematics industry. It will provide the building blocks to carry out the transition from closed to open systems as this is the key to bring telematics functionality in all new vehicles and unlock the market for on-line services. GST tried to establish this openness by further decoupling service development, service operation, delivery infrastructure, payment, in-vehicle software, in-vehicle hardware and in-vehicle networks.

HIGHWAY

Breakthrough Intelligent maps and GeographiC tools for the context aWare deliverY of e-safety and added-value services

HIGHWAY was to offer higher safety and location-based value added services where interactions between the person in control, the vehicle and the information infrastructure are addressed in an integrated way. HIGHWAY, through the combination of smart real-time maps, UMTS 3G mobile technology, positioning systems and intelligent agent technology, 2D/3D spatial tools and speech synthesis/voice recognition interfaces provided European car drivers/bikers/pedestrians/etc. with e-safety services and at the point of need interaction with multimedia (text, audio, images, real-time video, voice/graphics) and value-added location-based services.

81

HUMANIST

Human Centred Design for Information Society Technology

The goal of HUMANIST was to create a European Virtual Centre of Excellence on HUMAN centred design for Information Society Technologies applied to Road Transport (IVIS and ADAS), with a coherent joint programme of activities, gathering research, integrating and spreading activities. Integrating Activities will permit to manage and to consolidate the network structure by promoting the mobility of researchers, by optimising the pool of existing experimental infrastructures, by setting up electronic tools (common database, web-conference, e-learning) for knowledge sharing.

I-WAY

Intelligent cooperative system in cars for road safety

I-WAY was a research project that resulted in an innovative cooperative driving platform which ubiquitously monitors and recognises the road environment and the driver's state in real time using data obtained from three types of sources:

- the in-vehicle sensing system;
- the road infrastructure;
- neighbouring cars.

It supports both road-to-vehicle and vehicle-to-vehicle communication in order to enhance drivers perception on road environment and improve their responses in critical traffic scenarios. I-WAY developed new and efficient methods for processing multi-sensorial signals based on sensor management and data fusion techniques.



MORYNE

EnhanceMent of public transpORt efficiencY through the use of mobile seNsor nEtworKs

Project MORYNE aimed to contribute to greater transport efficiency, increased transport safety and more environmental friendly transport by improving traffic management in an urban and sub-urban area.

The project focused on:

- the development of an approach for new safety – and efficiency-oriented transport management and traffic management;
- the development and validation of technologies for appropriate sensing, information processing, communication, interfaces;
- the development of an in-laboratory demonstrator;
- the validation of the proposed concepts through field testing with Berlin Buses Authority;
- the analysis of potential impacts (social, economic, environmental) and the definition of further steps.

PREVENT

Preventive and active safety applications contribute to the road safety goals on European roads

The project supported the Commission actions aiming to promote the development, deployment and use of Intelligent Integrated Safety Systems in Europe. PReVENT has contributed to help drivers to avoid accidents: depending on the significance and timing of the danger, the systems will alert the drivers as early as possible, warn them and, if they do not react, actively assist or ultimately intervene.

REPOSIT

RElative POSitioning for collision avoidance systems

REPOSIT concentrated on Intersection and Longitudinal Collisions, where most noticeable performance improvements are expected.

For this purpose, REPOSIT performed a user needs and system specifications analysis and translated them into algorithms and suitable v2v communications models, for test and simulation. Simulation results were analysed and conclusions obtained. Additionally, in-vehicle integration feasibility analysis, certification procedures and interaction with standardisation activities and exploitation of results took place.

SAFESPOT

Co-operative Systems for Road Safety 'Smart Vehicles on Smart Roads'

One of the main aims of SAFESPOT is to develop a 'Safety Margin Assistant' which will extend 'in space and time' the safety information available to drivers by:

- using both the infrastructure and vehicles as sources (and destinations) of safety-related information, and definition of an open, flexible and modular communications architecture;
- developing the key enabling technologies: accurate relative localisation, ad-hoc dynamic networking, dynamic local traffic maps;

- developing a new generation of infrastructure-based sensing techniques;
- testing scenario-based applications to evaluate the impacts and end-user acceptability;
- defining the practical implementation of such systems, especially in the interim period when not all vehicles will be equipped;
- evaluating the liability aspects, regulations and standardisation issues which can affect implementation: involvement of public authorities from the early stages will be a key factor for future deployment.

SAFETEL

Safe Electromagnetic Telecommunication on Vehicle

The project contributed to the development of Intelligent Integrated Safety Systems in Europe and aimed to improve the robustness of motor vehicles against electromagnetic (EM) disturbances providing advanced tools for prediction, design and testing. Results show improved road safety and support



competition of the European automotive industry. A higher level of safety than current standards for internal and external EM environment have been achieved. Simulation and test strategy have been defined and an advanced set of design

tools provided to guarantee the proper functioning of electronic equipment in the presence of new complex receivers and transmitters such as GPS, GSM, Bluetooth and Time Modulated Ultra Wideband.

SAFETY TECHNOPRO

Training System on New Safety Technologies for Road Transport Addressed to Professional Bodies of the Automotive Sector

The most important technical work is the definition and elaboration of the training system prototype, constituted by six modules adapted to the specific professional bodies, and also characterised by a technological updating module, that will allow integrate on-line the most recently commercialised safety technologies. The prototype was tested in 400 workshops and dealerships.

SEVECOM

SEcure VEhicle COmmunication

SEVECOM focused on communications specific to road traffic. This includes messages related to traffic information, anonymous

safety-related messages, and liability-related messages. The foreseen work includes:

- Identification of the variety of threats.
- Specification of architecture and of security mechanisms.
- The definition of cryptographic primitives which take into account the specific operational environment.

SPARC

Secure Propulsion using Advanced Redundant Control

The goal of SPARC was to substantially improve traffic safety and efficiency for heavy goods vehicles using intelligent x-by-wire technologies in the power train. To prove this standardised

concept a SW/HW platform has been developed that is scalable down to small passenger cars (sPC) and be integrated there in. Natural motion is described by a vector (direction and velocity). The driver creates the desired motion vector, while being supported by an exchangeable HMI. Additionally a safety assistance and evaluation system (based on an interactive display information system using satellite navigation systems (GPS) and a smart camera to inspect the environment) creates another motion vector in parallel (the redundant vector).

83

TRACE

TRAffic Accident Causation in Europe

The objective of TRACE was to provide the scientific community, the stakeholders, the suppliers and the public with an overview of the road accident causation issues in Europe based on the

analysis of any and all current available databases which include accident, injury, insurance, medical and exposure data (including driver behaviour in normal driving conditions). The idea was to identify, characterise and quantify the nature of risk factors, groups at risk, specific conflict driving situations and accident situations; it helped to estimate the safety benefits of a selection of technology-based safety functions.

TRACKSS

Technologies for Road Advanced Cooperative Knowledge Sharing Sensors

TRACKSS' strategic goal was to enable a breakthrough in the current systems for sensing and predicting flow, infrastructure and environmental conditions surrounding traffic, with a view to improve road transport operations safety and efficiency.



WATCH-OVER

Vehicle-to-vulnerable road user cooperative communication and sensing technologies to improve transport safety

The project carried out RandD activities with the scope to design and develop a cooperative system for the prevention of accidents involving vulnerable road users in urban and

extra-urban areas. In order to develop and demonstrate cooperative systems for road transport that will make transport more efficient and effective, safer and more environmentally friendly, the system concept will be based on interaction between an in-vehicle module and user's devices. It foresees the development of a cooperative system integrating low cost communication technologies, as an extension to autonomous sensor based systems, in combination, if feasible, with localisation technologies, in order to increase the performances needed to cover the most critical situations.

Road safety researches FP7 – DG TREN

Acronym	Title	Total Cost (€)	EC Contributions (€)	Duration
DaCoTa	Road Safety Data Collection, Transfer and Analysis	7 306 481	5 500 000	01/05/2009 - 31/10/2011
Total Cost		€ 7 306 481		
EC Contributions		€ 5 500 000 = 75.27%		

84

DaCoTA

Road safety data collection, Transfer and analysis

The project will cover subjects such as: accident data from macroscopic level to in-depth analysis; road safety measure evaluation and policy benchmarking; data on users' behaviour

and attitudes; and further integration of various categories of analyses with the aim of:

- transforming knowledge into policy through the European pooling of accident data;
- bringing European methods for accident data collection, transfer and analysis developed and tested within FP5 & FP6 to a more mature level;
- preparing the path for routine activities.

Road safety researches FP7 – DG RTD

Acronym	Title	Total Cost (€)	EC Contribution (€)	Duration
2-BE-SAFE	2-Wheeler behaviour and safety	3 997 825	3 800 000	01/02/2009 - 31/12/2011
ASSET-ROAD	ASSET Advanced Safety and Driver Support in Essential Road Transport	6 649 260	6 149 926	01/07/2008 - 31/12/2011
CASPER	Child Advanced Safety Project for European Roads	3 985 621	3 854 265	01/04/2009 - 31/03/2012
COVER	Coordination of Vehicle and Road Safety Initiatives	454 579	454 579	01/04/2009 - 31/03/2012
EPOCh	Enabling protection for older children	1 526 228	1 400 000	01/02/2009 - 31/01/2012



Acronym	Title	Total Cost (€)	EC Contribution (€)	Duration
ESTEEM	'Enhancing Safety and security aspects in Transport rEsearch in the EuroMediterranean region'	648 678	648 353	01/04/2008 - 30/11/2009
INVITER	Implementation of Virtual Testing in Safety Regulations	3 541 600	3 199 630	01/04/2009 - 31/03/2012
INTERACTION	Differences and similarities in driver INTERACTION with in-vehicle technologies	2 967 512	2 499 963	01/11/2008 - 30/04/2012
ISi-PADAS	Integrated Human Modelling and Simulation to support Human Error Risk Analysis of Partially Autonomous Driver Assistance Systems	3 858 178	3 276 151	01/09/2008 - 31/08/2011
ITERATE	IT for Error Remediation And Trapping Emergencies	2 134 960	1 985 040	01/02/2009 - 31/01/2012
smart rrs	Innovative concepts for smart road restraint systems to provide greater safety for vulnerable road users	2 302 210	2 193 662	03/11/2008 - 31/10/2011
THOMO	Development of a Finite Element Model of the Human Thorax and Upper Extremities	2 211 919	2 065 269	01/02/2009 - 31/07/2012
THORAX	Thoracic injury assessment for improved vehicle safety	3 743 135	2 968 850	01/01/2009 - 30/06/2012
TYROSAFE	TYre and Road surface Optimisation for Skid resistance And Further Effects	1 165 804	1 165 359	01/07/2008 - 30/06/2010
ADSEAT	Adaptive seat to reduce neck injuries for female and male occupants	3 762 616	2 498 887	01/10/2009 - 30/03/2013
ASSESS	Assessment of Integrated Vehicle Safety Systems for improved vehicle safety	5 838 086	3 643 648	01/07/2009 - 31/12/2012
FIMCAR	Frontal Impact and Compatibility Assessment Research	5 998 823	3 804 598	01/10/2009 - 30/09/2012
PROLOGUE	Promoting real life Observations for Gaining Understanding of road behaviour in Europe	2 722 005	1 999 228	01/08/2009 - 31/07/2011
Safer Braln	Innovative Guidelines and Tools for Vulnerable Road Users Safety in India and Brazil	2 560 961	1 872 081	01/10/2009 - 30/03/2013
SAFETRIP	Satellite Application For Emergency handling, Traffic alerts, Road safety and Incident Prevention	13 089 617	7 890 199	01/10/2009 - 30/09/2012
SAFEWAY2SCHOOL	Integrated system for safe transportation of children to school	3 668 737	2 764 638	01/09/2009 - 31/08/2012
SKIDSAFE	Enhanced Driver Safety due to Improved Skid Resistance	5 663 323	3 267 000	01/11/2009 - 31/10/2013
Total Cost		€ 82 491 677		
EC Contributions		€ 63 401 326 = 76.85 %		



ICT Projects FP7 – DG INFSO

Acronym	Title	Total Cost (€)	EC Contributions (€)	Duration
ADOSE	Reliable application specific detection of road users with vehicle on-board sensors	10 200 000	6 100 000	01/01/2008 - 31/12/2010
ARTIC	Antenna Research and Technology for the Intelligent Car	466 540	361 000	01/04/2008 - 31/03/2010
ATESST2	Traffic Efficiency and Safety through Software Technology - Phase 2	3 760 000	2 290 000	01/07/2008 - 30/06/2010
E-FRAME	Extend FRAMEwork architecture for cooperative systems	1 350 000	1 040 000	07/05/2008 - 06/05/2011
EUROFOT	European Field Operational Test on Active Safety Functions in vehicle	21 570 000	13 900 000	01/05/2008 - 31/08/2011
eVALUE	Testing and evaluation methods for ICT-based safety systems	3 760 000	2 350 000	01/01/2008 - 31/12/2010
EVITA	E-safety Vehicle Intrusion proTected Application	6 020 000	3 830 000	01/07/2008 - 30/06/2011
FESTA	Field opERational teSts supporT Action	2 110 000	1 400 000	05/11/2007 - 05/04/2008
FNIR	Fusing Far Infrared and Near Infrared Imaging for PedestriTITLEan Injury Mitigation	3 120 000	1 900 000	01/01/2008 - 30/06/2010
FOT-NET	Field Operational Tests Networking and Implementation	1 230 000	1 230 000	01/06/2008 - 31/08/2010
GEONET	Geo-addressing and geo-routing for vehicular communications	2 990 000	1 900 000	01/02/2008 - 31/01/2010
HAVE-IT	Highly automated vehicles for intelligent transport	27 760 000	17 000 000	01/02/2008 - 31/07/2011
INTERSAFE 2	Cooperative Intersection Safety	6 500 000	3 860 000	01/01/2008 - 31/12/2010
iTETRIS	An Integrated Wireless and Traffic Platform for Real-Time for road traffic management solutions	4 460 000	2 970 000	01/07/2008 - 31/12/2010
NEARCTIS	A Network of Excellence for Advanced Road for cooperative traffic management in the Information Society	3 130 000	2 500 000	01/07/2008 - 30/06/2012
PRECIOSA	Privacy Enabled Capability In co-Operative systems and Safety Applications	2 470 000	1 670 000	01/03/2008 - 28/02/2010



Acronym	Title	Total Cost (€)	EC Contributions (€)	Duration
PRE-DRIVE	PREparation for DRIVING implementation and Evaluation	8 520 000	5 010 000	01/07/2008 - 30/06/2010
ROADIDEA	Road Map for Radical Innovations in European Transport Services	4 900 000	3 350 000	01/12/2007 - 31/05/2010
ROSATTE	Road safety attributes exchange infrastructure in Europe	4 660 000	3 800 000	01/06/2008 - 30/06/2010
SAFERIDER	Advanced telematics for enhancing the SAFETy and comfort of motorcycle RIDERs	5 370 000	3 500 000	01/01/2008 - 31/12/2010
SCVP	Smartest Cars Video Project	1 410 000	1 290 000	01/01/2008 - 30/06/2010
SMART-VEI	The Smart-Vehicle	5 450 000	3 500 000	01/03/2008 - 28/02/2011
TELEFOT	Field Operational Tests of Aftermarket and Nomadic Devices in vehicles	14 440 000	9 700 000	01/06/2008 - 31/05/2012
Total Cost		€ 145 646 540		
EC Contributions		€ 94 451 000 = 64.84 %		

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