

Progress Report of the eSafety Working Group RTD

4th Plenary Meeting of the eSafety Forum Hanover, Germany, 2nd of June 2005

Working Group Title and Chair

eSafety Working Group RTD

Chair: Arnold van Zyl – Director – EUCAR (European Council for Automotive R&D)

The members of the working group were recruited from a broad range of stakeholders representing the automobile and parts manufacturers, telecommunications operators, road infrastructure builders, the academic community, member state representations as well as civil society. A list of the WG members is attached in Appendix 1.

Objectives and Methodology

To identify and map the Regional, National and European research, technology and demonstration projects that may contribute to addressing the recommendations of the High Level Group on eSafety.

To identify the priorities for research areas for integrative European research, technology and demonstration projects in the field of eSafety.

On the basis of these priorities, a set of recommendations were developed to act as the basis for future European collaborative research programmes supporting the eSafety initiatives

Approach:

In an intensive consultation process the members contributed to mapping of current RTD activities at the Regional, National and European level. A matrix (Appendix 2) was generated in which the content of 77 projects and initiatives in the broader area of eSafety were analysed. The content of the projects and initiatives were analysed with respect to their main focus – The following categories were considered: (share of total R&D effort indicated as an approximate % in brackets)

- Accident Causation (2%)
- Road Infrastructure and Architecture (14%)
- Telecommunications (7%)
- In Vehicle systems and electronics (12%)
- Human factors (17%)
- On Board accident prevention systems (35%)
- *On Board systems for occupant protection in the case of an accident** (6%)
- Post Accident emergency and rescue systems (2%)
- Cost Benefit Analyses (2%)

**Passive safety is not strictly considered as an eSafety issue but the data were included for completeness*

On the basis of this analysis and a broad consultation in the eSafety community, a set of future research priorities was defined.

Current EU research activities related to eSafety

Within the Member States as well as at the European level - within the EU 6th Framework program for RTD - a comprehensive set of complementary projects are in progress addressing issues related to eSafety.

Member State eSafety activities are contained within National Transport research programmes. In particular, research programmes dealing with Traffic Safety and Security and Intelligent transport systems address safety relevant research topics.

A summary of the member state activities is contained in table 1

Member State	Programme
Germany	Invent, Fleetnet
France	Predit, Arcos
Italy	Infonebbia
Spain	National Programme on safety
The Netherlands	Summits, Roads to the Future, TRANSUMO
Sweden	ISA, National + Volvo programmes
UK	Traffimatics

Table 1: A summary of the Member State R&D Programmes relevant to eSafety

At a European Level, the Framework Programme supports safety research. A summary of the relevant projects is presented in figure 2.

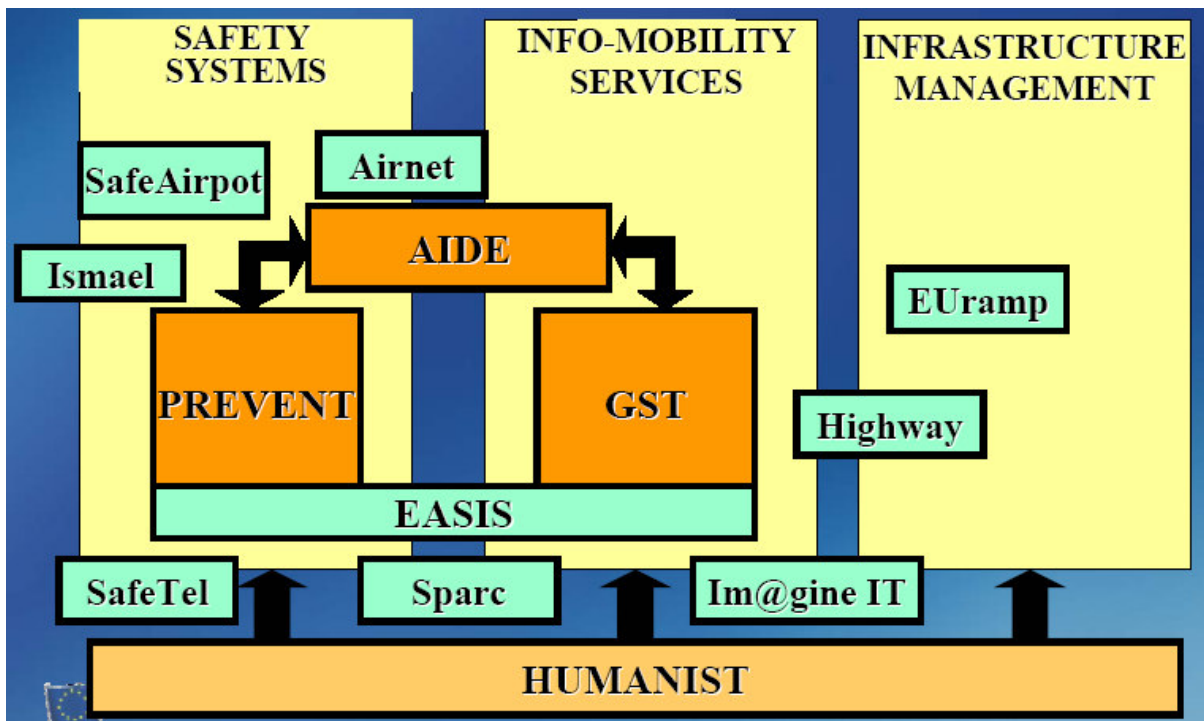


Figure 1: A summary of the EU R&D projects relevant to eSafety

Two major application areas of eSafety are- at the level of road transportation-
(a) the prevention of accidents and the mitigation of their effects and
(b) the availability of a European system for telematics that would enable a range of online services – including for instance emergency call of rescue services in the case of an accident.

These two application areas are represented by the projects **PreVENT** and **GST**.

PreVENT aims to develop, test and evaluate safety relevant applications within vehicles. These applications will be based on advanced sensor and communication functions and will be integrated into on board driver assistance systems. Typical applications to be developed are *Safe Speed and Safe Following, Lateral Lane Support and Driver Monitoring, Intersection Safety, Collision Mitigation and Vulnerable Road User Protection*.

The project **GST** aims at creating a standardized framework for end-to-end, in-vehicle telematics. The following specific areas of online service provision will be developed: *Rescue* – ensuring automatic emergency call in the case of an accident. *Enhanced floating car data* – uses vehicles as sensors for real time traffic data and *Safety channel* – allows for the broadcast and download of safety relevant information.

The application focussed projects such as **PreVENT** and **GST** require a common basis to ensure a seamless deployment of their respective functions. A set of transversal projects and networks are underway which all contribute to the common foundation required for the deployment of eSafety relevant applications:

- an agreed, adaptive and intuitive human machine interface (**AIDE and HUMANIST**)
- a common, scaleable and robust vehicle architecture (**EASIS**) not susceptible to electromagnetic interference (**SafeTel**)
- X by wire systems and architectures supporting accident avoidance algorithms and mitigating measures – especially focussed on heavy duty commercial vehicles (**SPARC**)
- standardized location based access points for transportation information (**Imagine IT**) supported by intelligent maps and geographical tools (**Highway**) as well as information relating to infrastructure aspects (**EURAMP**)

In addition, to the R&D projects dealing with road transportation, Airport and Airspace safety issues are addressed in the projects **ISMAEL** (Surveillance and Management of Airport functions), **SafeAirport** (Acoustic systems for Air traffic management) and **AIRNET** (Runway safety, congestion control and emergency management).

General observations

The analysis of the projects at National and European level result in the following observations:

- The majority of the activities are strongly focussed on in-vehicle technologies and systems for accident prevention and mitigation.
- No systems approach to safety with an inclusion of the essential non automotive aspects is recognizable.
- Protective safety features should be linked to the in-vehicle and environmental safety relevant sensors
- No apparent coordination the Member State and EU activities in the area of eSafety R&D are evident.
- Deployment projects in the area of eSafety are strongly atomized and provide local, solutions that are not, in general, transferable to other regions.
- A European/Global market for safety applications will require much more coherent R&D inputs to standardization of safety systems.

Major areas of future e Safety R&D focus in Future R&D

On the basis of the analysis op the set of projects the following specific recommendations for future R&D topics in the area of eSafety are put forward:

1. Accidentology and Impact Assessment

- R&D to establishment harmonized European accident databases capturing information relating to the vehicle, driver and infrastructure associated with the accident.
- R&D to develop predictive and statistical methodologies to support the impact assessment and effectiveness of measures that support road safety should be started. The methodologies should encompass safety measures relating to the vehicle, driver and infrastructure.
- An improved understanding of behavioural adaptation is of great importance for more accurate safety benefit estimation.
- Comparative analysis of the effectiveness of safety measures and technologies should be carried out.

2. Human factors

- Investigation of human behavioural adaptations to the introduction of novel technological cooperative systems. Investigation of the influence of such behavioural changes on the overall safety system.
- The development of adaptive HMI principles and systems that would allow the road user to interact optimally with the vehicle and infrastructure.

- HMI integration - The investigation of how different applications (including nomad devices, remote services and cooperative systems in general) could share a common in-vehicle HMI in a safe and efficient way.

3. Vehicle systems

- Decreasing the cost and increasing the reliability and redundancy of sensor and recognition technology.
- Ensuring appropriate, hierarchical fusing of sensor data.
- Development of robust actuation devices supported by an open, scaleable safety critical electronic architecture.
- Integration of such sensors and actuators into systems that interoperable between all vehicle platforms. The information should feed protective safety systems and features.
- Novel, intuitive in-vehicle information and input systems (eg virtual reality projections) resulting from the synergy effects of vehicle to vehicle and vehicle to infrastructure communication.
- Use of potential opportunities provided by co processing

4. Infrastructure systems

- Investigate how new vehicle technologies could influence design of roads (or could even be used for road infrastructure) with stronger involvement of road authorities and road operators in R&D project.
- Develop HMI standards for information on road infrastructure.
- Develop models for the integration of the technologies and management of information at a pan-European level.
- Assessment of how for example Galileo, UMTS, WiFi Lan and other electronics systems (such as TETRA) could contribute to the goals of eSafety and support cooperative systems.

5. Autonomous, cooperative systems for efficiency, safety and mobility.

- Development of a functional, open, scaleable architecture allowing seamless communication between vehicles as well as between vehicles and infrastructure. In addition this architecture should provide the possibility for seamless data exchange between road data capturing and processing centres.
- The development of value added services enabled by cooperative systems – navigation, safety and power-train and energy management.
- The development of systems to support safety of vulnerable road users, safety and efficiency of goods distribution and encourage intermodality.
- Large scale demonstration/field tests for deployment of cooperative systems.
- The development of standards for cooperative systems and interoperability to favour compatibility and diffusion.

6. Post accident & emergency management

- Further R&D into the required technical architecture, structure and interoperability of eCall and emergency management systems in general.

- Investigate aspects of synergy between eCall , civil protection and emergency management

7. Non technical aspects

- Investigation of organisational aspects of involving the stakeholders (Telecom, road builders and OEM's) in the planning, deployment and upgrading of "intelligent" infrastructure.
- Investigation of all aspects of liability and privacy related to cooperative systems.
- Investigation of business cases based on cooperative systems also investigating the potential synergy with technologies for Automatic Debiting Systems.

Concluding remarks

To reach the ambitious target of the road safety charter - halving the number of road deaths by 2010 – an integrated R&D approach in eSafety is needed complemented by R&D activities in the area of protective safety. Such an approach should extend the focus of the work beyond the vehicle to include the driver as well as the road and communication infrastructure.

In addition to the specific recommendations in the above the need is recognized to establish a mechanism to coordinate the European R&D efforts and to deploy the results in a large scale, generic deployment and demonstration project. In this light the WG RTD eSafety recommends investigating the establishment of a large scale demonstration initiative on Cooperative Systems for eSafety.

Arnold van Zyl

Brussels, 22 April 05

[Appendix 1 – Members of the Working Group](#)

[Appendix 2 – Matrix of the projects evaluated](#)