

The future of Safety in OEM's perspective – G. Burzio
Centro Ricerche Fiat

Dear Sirs, Madams,

First of all I would apologise Mr. Di Giusto, CEO of Centro Ricerche Fiat. He accepted with pleasure to open this session but he has been requested to come back in Turin this morning to attend a meeting at FIAT headquarters. He supported this event during all the phases of its development since he is fully persuaded of the relevance of the work being performed and it is an honour for me to speak on his behalf and to open the first session of the Technical Conference.

On behalf of all the partners involved I would like to express my appreciation to the European Commission for its long-running commitment to Road Safety activities.

I am absolutely certain that this event is an important step to achieve the Lisbon agenda set up in March 2000: make the European Union 'the most competitive and dynamic knowledge-based economy in the world' by 2010. I see here many engineers and experts from EUCAR, the European Council for Automotive R&D which has promoted the PREVENT project and many other colleagues from Industry, Research Institutes and Academia, who are driving automotive research forward with the ambition to make travel ever safer. Thank you for your dedication .

At the same time I'd like to thank all the people who have made this event possible by working with tremendous enthusiasm.

In this speech I will try to provide an overview of the vision of the future steps in Road Safety from the perspective of a vehicle manufacturer.

The starting point will be a short description of the task at hand followed by a synthesis of previous activities, looking at them also in terms of responding to the needs of society expressed by the European Union.

Then I intend to describe the current and general approach followed in the PREVENT project and the future steps which are are foreseen.

Let's start by considering the relevance of mobility in our century in order to understand why together we accepted the challenge of undertaking the Prevent project activities.

Mobility is timeless. It is vital for our society and to the national economies in order to run on time and efficiently.

Mobility is a key to social and human development as it facilitates, in several cases allows, social work activities, relations, employment, education, healthcare, leisure and cultural activities, and the indispensable supply of goods and services.

Originally the nature of road mobility was directly related to finding a means to allow people and freight overcome distances, but it soon had to answer other requests: the number of cars per thousand persons, in Europe, increased from 232 in the 70ties to 460 in our decade and the overall distance travelled by road vehicles has tripled in the last 30 years while the volume of road freight grew by 35% just in the last ten years.

But road mobility also heavily involves safety issues, - although the cost of mobility in term of injury and lives has decreased in the last decades, it remains unacceptable.

That is why road mobility was must become more environmentally friendly and "safer" in addition to being increasingly flexible and cost effective. In this context, ICT plays a fundamental role. The digital convergence of information

society and media services, networks and devices is finally becoming an everyday reality : ICT is getting smarter, faster, smaller, always “on-line” and easier to use.

Today, when we talk about Road Mobility, the idea of “safety” is immediate: I have worked for a large car manufacturer for over 25 years I can proudly state that the European automobile industry has demonstrated our unswaying dedication to improving road safety through the continuous development of effective solutions.

We are here to see and try several of them.

From the European Vehicle Manufacturers point of view, the interest on Safety has a long history.

Since the beginning was clear that we were dealing with a series of issues which are extremely important but highly intricate and complex to solve.

Any solution required huge investments - therefore, to arrive at a sustainable solution, it was of utmost importance to share the effort between car manufacturers and suppliers, while also requiring public support.

This idea born in mid 80 and the first relevant step at European Level was the PROMETHEUS program, which started in 1986, within EUREKA, a pan-European initiative aimed at improving the competitive strength of Europe by stimulating development in such areas as information technology, telecommunications, robotics, and transport technology.

It was a pleasure to participate recently to the ERTICO general assembly and to find PROMETHEUS presented as a success story by the coordinator, prof. Panik. The project, led by 18 European automobile companies, several state authorities and over 40 research institutions, indeed represented a huge effort.

PROMETHEUS was a pre-competitive research project, with the output being a common technological platform to be used by the participating companies once the product development phase began.

The overall goals of PROMETHEUS fell into four categories:

Improved driver information - providing the driver with information from new sources of technology that were not previously available. It was clear at that time that the lack of information or the inability to assess a hazard is often the primary cause of accidents, driver error.

Active driver support - when the driver fails at the driving task in some way, the system may aid the driver in an informative way or by active intervention.

Cooperative driving - establishing a network of communication between vehicles in order to provide drivers with relevant information for areas en route to their destination.

Traffic and fleet management - systems for the efficient use of the road network, ranging from highway flow control to fleet operations.

Those objectives was very ambitious and are still valid today and in the near future.

The most relevant progress made by PROMETHEUS was to look at the mobility problems, in particular safety and congestion, using a holistic approach.

Before that, in fact, Safety was mainly handled from the passive safety perspective.

Twenty years on we can state that many PROMETHEUS functions are on the market today.

The emphasis of PROMETHEUS, however, was on systems which have a large in-vehicle component to their design. The ultimate aim is allow all vehicles to have an on-board computer to monitor vehicle operation, provide the driver with information and assist with the actual driving task.

For traffic information a central control center is needed, to collect and distribute the information, but is still considered as part on the in-vehicle system.

This is, in my opinion, the only weak point of PROMETHEUS: the activities focussed generally on research related to in-vehicle autonomous systems, with the idea to completely solve the problems in this way.

The concept of the “zero accident car” was born during that time.

Now we are aware that the best solution is the “zero accident road transport systems” which means reducing as much as possible the accidents and their consequences - correspondingly we need the contribution of all components involved in the road transport: the vehicle, the road, the infrastructure, the road operator, the road authority, the public authority and, last but not least, the driver.

We need an integrated approach and we are now working on it. But before talking about this it is my duty to highlight the effort from the European Commission.

All the mentioned improvements related to transport Safety can be referred to the Framework established by the European Union which, through its three main Institutions, Council, Commission and Parliament, is encouraging Member States to raise the awareness and involvement regarding improving transport Safety.

The European Commission, on the basis that improved road Safety represents one of the European citizen's greatest expectations declared a targeted action programme to be established in the White Paper on Transport published in 2001.

Then in 2003 the European Road Safety Action Programme was launched to "Half the number of road accident victims in the European Union by 2010 by shared responsibility".

The strategy of the EC relates to the Council Resolution on the improvement of road safety made in 2000, where it's stated that:

- the adoption of measures to raise transport safety is an objective "specifically stated by the Treaty establishing the European Union" being one of the pillars of European Transport Policy
- Transport Safety it's up to many entities, both institutional and private, namely the European Union; National, Regional and Local Authorities of Member States; the OEMs and the end users.
- among the measures to improve Road Safety, a very important role is played by Research: specifically, the Council talks about Research related to telematic systems

The objective is to "halve the number of road deaths" by 2010 and we are here today to review much of the work has been done in terms of Research in that direction.

In 2003 the Council invited the Commission to continue its work on road safety issues and launch the necessary initiatives to that effect.

Just 2 years ago the Commission launched a new ambitious programme “i2010 – A European Information Society for growth and employment”.

The objectives of i2010 are fully integrated and consistent with the Lisbon strategy, comprehending the contribution of ICT to the quality of life also through the implementation of the “intelligent car”: smarter, safer and cleaner addressing environmental and safety issues arising from increased road use.

The European vehicle manufactures fully support this ambitious goal declared by the European Union while emphasizing that achieving the target is possible but only if all stakeholders concerned work together.

Needed is an integrated approach - as defined by the outset of the CARS 21 activity which was set up by Vice-President Verheugen in January 2005 to chart the way towards sustainable development of a competitive European automotive industry.

This means combining improvements in vehicle technology, road infrastructure, driver behaviour and enforcement of existing traffic regulations. Such an approach addresses the fact that safety on the road is a shared, societal responsibility, involving all participants, including road users, governments and vehicle manufacturers.

Following the identification of a series of priority measures, CARS 21 turned to discussing the effective implementation of the measures. The automotive industry outlined the importance of the measures in different pillars progressing in parallel so as to maximise the impact of the integrated approach.

Let me just recall an example.

The ESC, or electronic stability control, is an active safety measure that is very effective in helping to prevent accidents in critical situations. ESC seeks to stabilize the vehicle to avoid skidding and can reduce road crashes by more than 20 percent, especially in wet or icy conditions.

The European manufacturers, who invented ESC, increasingly equip their vehicles with this safety feature, either standard or as an option.

Unfortunately, the take up rate is still disappointing and often, when faced with the choice, customers prefer comfort or entertainment features instead.

The equipment rates of new vehicles vary greatly, therefore, from below 30% in Greece to over 90% in Sweden. In the main European markets, the picture is very different as well. Italy had a 31% equipment rate in 2005, UK 36%, France 42%, and Germany 72%

Clearly a key obstacle to higher market penetration is a lack of knowledge about the benefits of ESC, as shown by a recent Eurobarometer poll. From the outset ACEA has actively supported the consumer related activities from the Commission's eSafety Programme and has joined the eSafety Communication Platform and subsequently the eSafety Aware Campaign.

While much has been done to improve vehicle safety, more than 95% of all accidents involve human error. Inappropriate speed, driving under the influence of alcohol or medication and not wearing seatbelts are major factors in accidents today. For this reason, driver behaviour is one of the key components of the integrated approach required to further dramatically reduce traffic casualties.

Driver behaviour can be positively influenced through better driver education and training, as well as stricter enforcement of existing traffic rules and regulations. As the European Commission found in its CARS 21 final report,

better enforcement of existing traffic legislation is an efficient and cost-effective means to help cut the rate of traffic fatalities on European roads. Along with vehicle design and technology and driver behaviour, road infrastructure is the other key component of the integrated approach to road safety. EuroRAP, the European Road Assessment Programme supported by ACEA, points out that road infrastructure improvements are essential to achieve the EU target of a 50% cut in road deaths by 2010. Roads, designed to minimise bottlenecks and ensure better traffic flow, can have a significant impact on road safety. Investments in construction and maintenance of roads infrastructure are crucial. Yet, the quality of infrastructure is a key determinant of road safety for vehicle occupants, motorcyclists and the most vulnerable road users such as pedestrians and cyclists.

Some words are worth to be spent on commercial vehicles.

While trucks are often perceived as a road safety concern, commercial vehicles are involved in only about 10% of fatal road accidents. Over the past two decades, the number of fatalities involving trucks in Europe has declined at a faster rate than the overall downward trend in road accidents and fatalities. This is because commercial vehicle manufacturers are making important contributions towards improving road safety by devoting significant resources to building safety into their vehicles. As with passenger cars, to harness the full potential of the improvements in commercial vehicle safety, an integrated approach must be pursued also in this field, combining vehicle safety systems with well-trained, responsible drivers, and an upgraded, well-maintained road infrastructure.

Moreover the automotive industry stressed jointly with the Commission the need of increasing awareness of people.

The European automotive industry spends some € 20 billion a year on research and development and a large proportion of this investment is dedicated to developing enhanced passive and active safety technologies for new vehicles. These advanced technologies, applied to vehicles and infrastructure, can greatly contribute to improved road safety and prevent or lessen the severity of accidents. But even when the latest safety technology is available, consumers do not necessarily realise the benefits that such additional safety options can bring. It takes time, therefore, for new features to be picked up by the market.

According to a 2006 Eurobarometer study, European motorists attach high importance to automotive safety, but price remains the most important factor in the purchase of a car. Affordability is key to consumers and additional electronic safety equipment often competes with comfort features for the consumer's limited budget. In an effort to help raise consumer awareness of the benefits of investing in safety options, European automotive manufacturers have joined the European Commission in launching the "eSafetyAware" campaign last May. The eSafety initiative aims to increase the development, deployment and use of intelligent safety systems to improve road safety.

Within this scenario, the Integrated Project PReVENT, could be interpreted as relevant step for the implementation of an integrated approach.

PReVENT responds to the need to move towards a new situation, where cars don't crash anymore.

IP PReVENT is organised through different subprojects related, among others, to Sensors, Digital Maps, Lateral Support, Vulnerable Road Users and Collision Mitigation. I don't want to anticipate any further detail, during these

days the achievements in the mentioned fields will be fully explained and demonstrated.

But PREVENT is still one step in the battle we are facing to raise Road safety to an “acceptable” level.

So let’s now take a look at the forecasted future of road safety.

We understand that we must take a step forward towards this cooperative and integrated approach, a step in which all stakeholders are active and cooperate to avoid accidents by improving traffic flow.

New initiatives currently underway were launched in early 2006 to cover these new aspects. One large project, called SAFESPOT, promoted by EUCAR and that Centro Ricerche FIAT is honoured to coordinate, is devoted to the development of a “new generation” of safety functions based on the cooperation between vehicles and between vehicles and the road infrastructure. This “cooperation” is based on a communication network that is one of the most important development expected by this project. Since this communication network will be very useful also to solve other road transport problems, like congestion, the definition of this communication network and of the overall system architecture is done in parallel with other running projects, like CVIS and COOPERS, that are more devoted to understand as the cooperative approach could improve traffic flows and reduce congestions.

The potential of this cooperative approach is very clear to everybody: communication will not be limited by obstacles and road geometry and could be very rich. It will be very difficult, using only on-board sensors, to understand that the vehicle in front will decelerate shortly in order to get the next highway exit.

The main SAFESPOT activities are the followings.

To develop the scenario-based applications using the safety-related information provided by the network properly fused with the on board sensor data.

To define in commonality with other EC projects an open, flexible and modular communication architecture

To evaluate the impacts and the end-user acceptance. Also, the efficacy and the risks in the initial period, with a reduced percentage of equipped vehicles, must be carefully analyzed.

To evaluate the liability aspects, regulations and standardisation issues which can affect the implementation. These systems will deeply involve the whole society and a lot of organizational and political issues at regional, national and European level will surely be raised.

But the main critical problem to be solved is the ad hoc communication network.

Imagine a network whose nodes change continuously; a vehicle enter, another exit and when the density of vehicles becomes very high (for example in a urban scenario) congestion mechanism must ensure the network survival and the capability to maintain the exchange the of critical information.

Fast network setup, Low latency, high reliability and security are mandatory. A big consortium is active, the Car2Car Communication Consortium, to

develop a basic prototype version using IEEE802.11a (the WiFi protocol) as transmission layer were developed. But the IEEE802.11p standard is the expected to be the final choice.

SAFESPOT will define criteria for the Channel usage, message priorities, network management and will design and implement mechanisms to manage the network, to create a geo-broadcast storage in order to maintain an information alive in a specific area.

The final target is to assess a protocol, based on geo-aware multi-hop routing, that means that a vehicle is able to act as a data router and the message routing take into account the position of vehicles when selecting the intermediate forwarding nodes.

I don't want to boring you with all these details but I would like to stress again the importance of the cooperation in this field. For example only by pushing together we will convince Communication Authorities to allocate two 20 Mhz frequency band in the 5.9 Ghz area, reserved to Safety applications. And without this frequency allocation all efforts will be useless.

Another key technology for SAFESPOT is the accurate positioning.

A sub-meter precision is needed. Standard GPS or even Galileo are not sufficient.

SAFESPOT is considering solutions using GPS raw data in a similar way to Differential GPS techniques but without the need of stationary reference, in combination with other complementary sensor data, including landmarks registered on digital maps

But if the research will solve all these critical point new safety applications will be possible, please let summarise the most important ones.

SAFESPOT is aimed to provide in each vehicle a SAFETY MARGIN ASSISTANT that is a kind of helpful and wise friend able primarily to suggest the best actions to keep the vehicle far from the emergency situations or to properly warn the driver when a dangerous situation is possible.

In more technical terms this assistant will represents the envelope of different applications.

The objectives are:

- to improve the range, quality and reliability of the safety-related information available to 'intelligent vehicles' by providing 'extended co-operative awareness' through the real time reconstruction of the driving context and environment. This is an interpretation of the dynamic maps previously mentioned.
- to support drivers preventively to the proper manoeuvres in the different contexts.
- to manage existing incidents to minimise further negative safety impact.
- to open the development of new safety applications based on the cooperative approach.
- to increase the safety for all road users including the vulnerable ones.

The applications may be are an extension and improvement of applications of the intelligent Autonomous vehicle made possible by the cooperation, others covers new scenarios, not possible with a traditional approach.

It's a pleasure for me to announce to this huge audience that Prevent is closing but we are ready and active on this new challenge called Safespot a well known project funded by IST and coordinated by Centro Ricerche FIAT. Safespot includes 51 partners from 12 different European countries and involves car makers, suppliers, road operators, service providers and research centres.

Now I'm getting at the end of my speech and I'd like to summarize some conclusions.

We see in the present days the results of the huge work done in the Prevent project, but we must keep in mind that a road traffic without accidents and injured people is still far in the future. We need the active contribution of all components, vehicle, road and driver to reach these objectives. We, as OEMs, are actively working in the Road Transport Technology platform, ERTRAC, to promote future research frameworks where this cooperation will continue and improve.

We are already working in this cooperative approach.

So please start to plan in your agenda this future event in the road safety timeline: in 2009 the final event of the SAFESPOT project will be held, probably around this time of year.

So I truly hope to see all of you there in a couple of years time.

But in the meantime – remember to buckle up and drive safely, after enjoying this PREVENT event which promises to be a landmark in this history of road safety R&D.

So now I would like to thank you for your attention and hand over to Mrs. Zobel