ESV 2001 - GOVERNMENT STATUS REPORT FROM THE NETHERLANDS :
EXPLORING THE ROLE OF TELEMATICS IN ROAD SAFETY, A DUTCH PERSPECTIVE.

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THE DUTCH ROAD SAFETY POLICY

In the Netherlands the ultimate perspective of road safety policies is to achieve zero traffic fatalities. The strategy developed to accomplish this is called Sustainable Safety. The most essential of Sustainable Safety is that it tries to design the traffic system in such a way that human error is avoided. Accident research clearly indicates that up to 90% of all accidents is caused by human errors. If the components of the traffic system (infrastructure, vehicles) can be designed in such a way that safe behaviour is the natural choice for people in traffic, many accidents may be avoided.

The Dutch national road safety policy was updated in the National Transport Policy Paper that was published in October of the year 2000. This document contains the overview of the actions that are planned to take place until 2010. In this period 2.5 billion Euro's will be invested in additional measures to improve the safety of local and regional roads into 30 and 60 km/h zones and other types of self-explaining roads. In addition to that improvements will take place on the level of the human factor by stimulating different types of permanent education. The objective from this initiatives is to reduce the number of fatalities by 25% to 750 and the number of injuries to 14.000 in 2010.

The National Transport Policy Paper also aims at significant contributions from new technologies to the improvement of road safety. This paper will elaborate the views on new safety benefits that may be induced by new telematic technologies, and will focus in particular on the topic of speed.

Major causes for the current number of traffic fatalities are drunk driving, lack of use of seatbelts and last but not least speeding. The use of vehicle measures to reduce this are relatively limited. Drunk driving is mainly dealt with by behavioural oriented initiatives such as education and enforcement. The use of safety devices is predominantly stimulated through education, information campaigns and in-car installation. The reduction of inappropriate speed behaviour is coped with by driver education, information campaigns, enforcement and traffic calming. From a vehicle perspective some years ago speed limiters have been introduced in heavy lorries and coaches.

	Behaviour	Infrastructure	Vehicle	Telematics
Alcohol	X			Alcohol lock
Seatbelts	X			Seatbelt reminder
Speed	X	X	X	ISM

New in-car technologies are becoming available that may offer new perspectives for dealing with the major causes for accidents, either complementary to the current instruments or perhaps even as a substitution. For the intoxicated driving problem experiments with alcohol locks are planned, with regards to the stimulation of seat belt usage we will support the introduction of intelligent seatbeltreminders. Last but not least in order to reduce speeding problems intelligent speed management (ISM) technologies will be promoted. It is on this topic that the next sections will further elaborate.

SPEEDING AS A SAFETY PROBLEM IN THE NETHERLANDS

Investigations show that a large number of drivers violate the posted speed limits. On motorways approximately 30% of drivers speed, on regional roads this is the case with 50% while in built-up areas this is the case for 30-70% of drivers according to the type of road. The Dutch Road Safety organisation SWOV has indicated that if 90% of all drivers would drive in compliance with current speed limits on roads outside built-up areas alone already 200 fatalities could be prevented.

In recent years specific attention was given to the problems of vulnerable road users in residential areas. Approximately 40% of annual fatalities and 60% of injuries take place in built-up areas, about 75 % of these are vulnerable road-users (e.g. pedestrians, cyclists, moped-riders). In order to acquire information on possible new effective means to deal with this safety problem the Dutch Parliament invited the Minister of Transport by amendment to investigate the possible benefits of introducing Intelligent Speed Adaptation technology in cars.

In strategies so far used a major role was reserved for the introduction 30 km-zones, but within municipalities the criticism on the deployment of speed humps is increasing for several reasons:

- problems for public service vehicles that need to access 30-km zones
- environmental nuisance(noise, emission) for people living next to speed-humps
- discomfort for drivers
- cost for municipalities related to the installation and maintenance of speed-humps.

The result is that there is great interest in a search for alternatives. In 1992 and 1997 a survey was made in European Union memberstates concerning Social Attitudes to Road Traffic Risk in Europe, the SARTRE project. Results from this project show that 54% of drivers in the European Union was in favour of introducing in-car speed limiters that would prevent them from speeding. National research in the Netherlands identifies similar level of support for such a measure, in particular if taken in residential aereas.
In addition to these figures model simulations done in the United Kingdom identified that automatic (or sometimes also referred to as mandatory) systems can have the largest positive implication for the safety figures. Depending on whether such systems can take into account dynamic situations the fatality reduction will be from 36% to 59%. The safety benefits of advisory systems or user-set systems are about half of the benefits of the automatic system.

Based on this information the choice was made to initiate a demonstration project with an automatic technology in a built-up area.

INTELLIGENT SPEED MANAGEMENT IN A RESIDENTIAL ENVIRONMENT: THE ISA TRIAL IN TILBURG

Objectives for doing a test was to assess the technical feasibility, the driver support and the traffic safety benefits. The study was executed from November 1999 until October 2000. In total 120 drivers were provided for 2 months with a car that was equipped with a differential GPS-based system that would automaticly prevent the driver from driving at a higher speed then the posted limit in a residential street in the test area. The system would limit the flow of fuel to achieve this. In the test area streets were included with 30, 50 and 70km/h speed limits.

Due to the limited number of cars participating in the test it was not possible to collect empirical data concerning the safety implications of the ISA system. The initial acceptance for ISA amongst drivers was 55%, after the test it increased up to 69% . Support for ISA rose even to 80% in a group that was exposed to additional information activities.

The experiment also showed that it was possible to deliver in a short timeframework a system that easily met the criterium of technical reliability.

A POSSIBLE FRAMEWORK FOR SPEED RELATED PROBLEMS

The duty of a government is to look for possible solutions for the problems that have been tabled by society. It is important to look for consensus within society for the character and causes for problems , as well as it is important to look for consensus regarding the type of countermeasures that are required. This implies that the most stringent instruments may not always be applied in order to gather support from different stakeholders.
With regards to speeding the type of problem differs in relation to the type of road and in connection to this the intervention that has to take place.
In order to cope with these problems we have the traditional instruments: human behaviour, infrastructure design and vehicle standards.

On the motorways speeding is causing problems in the field of mobility, for instance because inhomogeneous speed behaviour reduces the capacity of the roads . Speeding also has a negative impact on emissions, that increase rapidly above 100km/h. The safety problems on motorways are relatively limited, on an annual basis about 100 fatalities occur on the Dutch motorways, this is approximately 10% of the annual number of people killed in traffic.
Focussed on the safety perspective it is important to look at the type of accidents that occur on motorways. In general these are car to car accidents or single vehicle accidents
In order to cope with these problems we have the traditional instruments: human behaviour, infrastructure design and vehicle standards. Behavioural measures include expected further improvement of driver education under influence of the Third EU Driver License Directive, introduction of schedules for permanent education, improvement of publicity campaigns and enforcement activities. Taking into account the high quality of motorways leads to the perspective that the possibility to make further progress with infrastructural measures is limited. Substantial improvement of safety conditions will be possible thanks to progress in the passive and active safety performance of cars. For the use of Intelligent Speed Management systems the expected safety gains through behavioural policies and vehicle safety imply that introduction of automatic systems is not necessary. The introduction of advisory or user set systems will give enough safety benefits and will leave enough opportunities for citizens to enjoy their freedom of mobility. It may also help to avoid the creation of “Big Brother is watching you” feelings towards the authorities amongst users and producers of vehicles.

On regional roads the major problem caused by speeding is traffic safety, mobility and environmental issues are here less of a problem. Approximately 50% of all fatal accidents take place on this type of road, with car occupants being the major group of victims. The dominant types of accidents are car to car accidents (either during overtaking manouvres or at intersections), or single vehicle accidents.
Similar to motorways behavioural instruments (education, publicity campaigns and enforcement) will have a positive impact on the improvement of road safety. Within the framework of the second deployment stage of Sustainable Safety infrastructural measures will be introduced. Due to the lenght of the network, the large differentation in types of roads and the costs that must be made is the impact of these initiatives expected to be limited. The expected progress in vehicle safety will also pay off on regional roads. The overall assessment is that the conventional instruments (in particular aimed at behaviour and the vehicle) will still have such positive potentials so that introduction of advisory and user set based Intelligent Speed Management systems will be sufficient to achieve the desired levels of safety.

Safety is also the major problem on local roads, resulting in 40% of all fatalities. Accidents often are between cars and vulnerable road users, but also car to car accidents at intersections are frequently taking place. A major challenge is the protection of the vulnerable road user, nearly 400 annually die in traffic.
Besides the positive expectations with regards to behavioural instruments, there are also the more limited expectations concerning vehicle and infrastructural measures. Measures like pedestrian safe car fronts so far are difficult to realise, and in any case the difference in mass between a car and a vulnerable road user will always proof difficult to compensate for in the case of an accident. Infrastructural traffic calming in potential has high benefits, but is more and more under discussion due to its implications for comfort, environment and the financial implications. Local authorities are very interested in alternatives for speed humps, but insist that such alternatives should accomplish 100% compliance in order to be able to refrain from the installation of humps. It is for this reason that the automatic type of Intelligent Speed Management, the ISA system that imposes the speed limit on the driver seems to be the preferred option.

TO PUT A FRAMEWORK INTO PRACTICE

Policy instruments for speeding by roadtype

roadtype and major	Man	Road	Vehicle	Telematics
Local roads (safety)	XXX	XXX	X	automatic (ISA)
Regional roads (safety)	XXX	XX	XXX	advisory/ user set (ASA)
Motorways (mobility, safety emission)	XXX	X	XXX	advisory/ user set (ESA)

The concept of Intelligent Speed Management is considered to be part of the overall concept of Automated Vehicle Guidance. For the further deployment of these technologies in the Dutch road traffic system a major demonstration and deployment scheme is currently proposed, with an overall budget of nearly 175 million Euro.

Different pilots have been proposed so far, first one to mention is a large scale trial with an automatic Intelligent Speed Adaptation (ISA) system in a build up area. This would be a large scale trial to look for instance at traffic implications of such technologies. Proposed planning is to do this in 2002-2003. Concerning the regional road network a project with an Autonomous Speed Assistant(ASA) is suggested. ASA is seen as an advisory or perhaps even user-set system that will combine information on the road, with information on posted speed limits and characteristics of the car into a recommendation to the driver. Experiments with such systems could take place in 2002-2004. On the motorways the External Speed Assistant has been proposed. This is a advisory or user set functionality that combines information from dynamic traffic management such as speed limits with characteristics of the road and the vehicle. If used on designated lines even systems with guarenteed arrival times are considered. Such projects could take place in the years 2004-2007.

Deployment could be achieved by putting Intelligent Speed Management-technologies as a type approval requirement in all cars from a certain date, on which part of the road network this capability will be applied in what way may be left to national states under the concept of subsidiarity.

CONCLUSION

This paper elaborated how within the framework of the new Dutch National Transport Policy Paper the high expectations regarding contributions of new technologies will influence the objective to further improve road safety.

In this respect it may be concluded that:

- New telematic applications are coming, either as an addition to current instruments or sometimes even as a replacement for existing instruments.
- As an example for this development it may be concluded that Intelligent Speed Management has potentials, there is public acceptance and promising perspectives for possible effects.
- In order to proceed with these technologies it is important to show their benefits in relation to acknowledged safety problems.