

SPACE
Speed Adaption Control by Self Explaining Roads
 a research project of the
 cross-border funded joint research programme
“ENR SRO1 – Safety at the Heart of Road Design”

1) Introduction

“Safety at the Heart of Road Design” is a trans-national joint research programme that was initiated by “ERA-NET ROAD – Coordination and Implementation of Road Research in Europe” (ENR), a Coordination Action in the 6th Framework Programme of the EC. The funding partners of this cross-border funded Joint Research Programme are the National Road Administrations (NRA) of Austria, Belgium, Finland, Hungary, Germany, Ireland, Netherlands, Norway, Slovenia, Sweden and United Kingdom.

2) Project Facts

Duration:	01/01/2010 – 31/12/2011
Total Budget:	EUR 314.730,00
Coordinator:	Leif Sjögren, Swedish National Road and Transport Research Institute (VTI), Sweden e-mail: leif.sjogren@vti.se , tel: +46 13 20 43 59
Partners:	Suzanne Charman, Transport Research Laboratory (TRL), United Kingdom Carl VAN GEEM, Belgian Road Research Centre (BRRC), Belgium Jiri Ambros, Centrum Dopravniho vyzkumu (CDV), Czech Republic Aoife Ahern, University College Dublin (UCD), Ireland Alexander Fördös, Kuratorium für Verkehrssicherheit (KfV), Austria Adewole Adesiyun, Forum des Laboratoires Nationaux Europeens de Recherche Routière (FEHRL), Belgium

3) Short Project Description

A significant reduction in casualties can only be achieved by taking action on all three elements of the safe road system: driver, vehicle and road. Improving road infrastructure safety can be achieved by making roads forgiving and self-explaining. Self-explaining roads reduce crash likelihood and forgiving roads mitigate the severity of the outcome of a crash.

SPACE will identify solutions that offer the greatest potential safety gains through a state of the art review, international expert panel review, interactive visual tools and driving simulator experiment. This will lead to tools that can identify unsafe or non-explaining areas of the network and that are able to estimate the potential safety benefits of the road safety measure. These tools will register change in driving behaviour and also explain why changes occur. The developed tools will be used for evaluation of different measures aiming to find a self-explaining road. Other aims are to determine the speed adaption and situational awareness benefits of different self-explaining design measures. A comparison will be done of different approaches leading to recommended common strategies

The work will be focused on rural roads and having Vision Zero and transnational benefits of the projects outcome in mind. Other considerations and limitations will be to look on effects of combination of measures, different road types and conditions, as well as different road user categories.

The results will be presented as guidance in technical notes and more comprehensively in a project report. Findings will be made available to road authorities, researchers and practitioners across Europe.

4) Expected Results

When driving, visual information is given by light beams reflected from objects in the road environment, striking the eyes of the driver. This information is immediately processed by the brain, automatically leading to a certain driving behaviour. The American psychologist, J.J. Gibson, has called this process “the principle of affordance”. This indicates that the driver unconsciously judge benefits and threats in the road environment and acts in a way that he or she can afford. In other words, automatically, the driver tries to take advantage of benefits and avoid threats. This automatic driving procedure means that the driver does not need to take any specific decision while driving; information is registered automatically and the driver is free to use the brain for some other action.

The concept “principle of affordance” is closely related to the concept “self explaining roads” (SER). A SER continuously informs the driver how to behave and what to expect. This behavior may include:

- Choice of speed
- Choice of lateral position
- Expectation of the presence of other types of road user
- Expectation of the behaviour of other road users
- Expectation of changes in the road environment ahead

Shortly, on a SER the driver behaves as intended by the road keeper and he/she will never be taken by surprise at any course of events on the road. The driver recognizes the road environment, independent of where in the country the road is found.

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Two-lane rural roads generally have lower geometric design standards and are not as well maintained as motorways. The accident rates for those rural roads are much higher than higher order roads. There are frequent occurrences of head-on and run-off-the-road accidents. These are often linked to high speeds, dangerous overtaking manoeuvres, driver inattention, design constraints, sight restrictions and road side obstacles. The self-explaining road and the forgiving road side are two cited concepts deemed to be able to reduce the number of accidents on rural roads.

The work of SPACE will as a start make an extensive state of the art and experience review to find European measures meeting the limitations and requirements of SPACE. SPACE will use the opportunity to compare different approaches found to formulate a transnational common strategy. From the extensive list of measures a selection will be done using expert groups using a structured interview technique. In this evaluation process estimation of cost benefits ratio based on reduction in speed and error, how many lives likely to be saved for what cost are factors that will be considered. At this stage a simpler evaluation method will be developed by using photos, videos and 3D animations in combination with the expert workshop. Later a more advanced evaluation method will be described using an advanced driving simulator. Since this type of equipment is expensive to use it's SPACES' ambition to compare the two methods to explore the possibilities when to use the simple method. This work will also lead to a validation of the simpler method.