The Acceptance of Intelligent Speed Adaptation (ISA) and the Use of Role-models:
A Strategic Procedure in Implementation of Speed -warning Devices

Sven Vlassenroot[1*], Johan De Mol[2],

1. Research fellow, Ghent University, Poel 16, B-9000 Ghent, Tel. + 32 9 264 82 09, Fax. + 32 9 264 83 90, E-mail sven.vlassenroot@ugent.be, URL : http://www.isaweb.be
2. Research Fellow, Ghent university, Belgium

ABSTRACT

Many trials with ITS were held around Europe, mostly concerning the drivers' behaviour and acceptance. Nowadays the focus has shifted towards achieving implementation and acceptance of these devices by the general public. In 1998, ISA was introduced in Belgium in the form of a large-scale questionnaire about "a carrying capacity on ISA." A first step in gathering acceptance and implementation strategies was made. In October 2002, a trial started in Ghent with 37 vehicles. Among the drivers there were test-drivers that could be considered role models. These drivers had a delegating - public function at the council of Ghent, an institution or company and were chosen because they could have influence on the general public, decision and opinion makers. Based on the results, which indicated a large acceptance of ISA and the existence of a possible carrying capacity with the general public, plans have been made for a new trial in Brussels: a first faze, ministers and politicians will drive with ISA as role-models. The main goal is to get a larger acceptance on ISA by the opinion and decision makers, creation of a further carrying capacity and to take the first steps into the implementation of ISA in Belgium.

KEYWORDS

intelligent speed adaptation (ISA), speed-warning devices, role-models, carrying capacity, acceptance, driving-behaviour, basic attitudes, implementation strategies.

A CARRYING CAPACITY ON ISA: TOWARDS A MODEL

Definition

New ISA or ITS devices can only be introduced meaningfully if there is a measurable social carrying capacity which can lead to a possible acceptance. The Ghent University and the Belgian Institute on Road-Safety (BIRS) [1] developed a method to measure the carrying capacity on road-safety and speed limitation. The carrying capacity denotes how people see mobility and transportation in relation with road-safety, especially on speed, speeding and restriction. This carrying capacity is based on the attitudes and opinions given by individuals, which stand for the general public. The concept determines several layers with mutual relations.

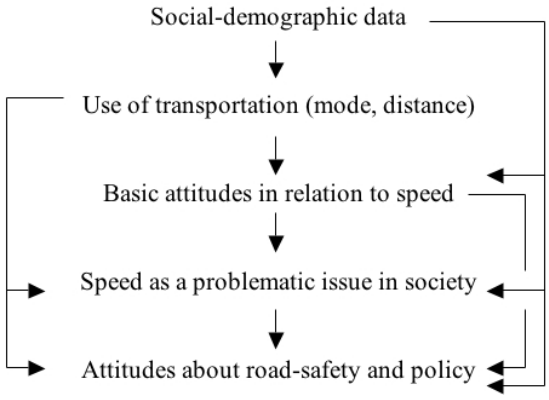

Figure 1 - a working model on measuring the carrying capacity of ISA

Layers of the Carrying Capacity

Social-demographic and use of transportation

The social-demographic issues and the individual transportation habits are the 'basic' factors for the creation of a carrying capacity. These determinants will influence almost all the layers of the carrying capacity model.

Basic Attitudes

The basic attitudes denote how people see mobility and transportation, in particular the perception of speed in relation to motorised vehicles. The basic attitudes were: 'driving is only satisfying with a nice car'; 'speeding is exciting'; 'drivers have to be too aware of other road users'; 'if I drive, I live it up'; 'driving fast saves time'; 'a car is only for use of transportation'; 'driving fast is liberating'; 'people should be stimulated to use the car less'; 'driving fast is fun'.

A Problematic Issue in Society

A social carrying capacity is also determined by 'being a (problematic) issue in society:' If there is no social indication that there is a problem about road-safety, speed and speeding; there will not be a possibility in future acceptance on ISA.

These indications are related to the actual situation on road-categorisation and speed limits, and how people see their own behaviour on speed and speeding. Questions are posed about how people see the relation between road-accidents and speed; in which conditions speed and speeding will be a problem; determination of speeding behaviour; and the feeling of insecurity.

Attitudes about Road-safety and Policy

Some of the abstract norms and values are made concrete in issues concerning in how people think about road-safety measures. At this level the 'real' discussion on possible acceptance will take place.

These 'layers' can be interpreted as sequential: the basic attitudes will determine in how issues about speed and speeding will be notified as problematic and how people will experience the policy on road-safety to handle the problem of speeding. For example: A driver who described his car as liberating and exciting and drives fast, will not recognise speeding as a problem. This driver will also not see measures taken against speeding as a priority or as useful.

THE CARRYING CAPACITY OF THE GENERAL PUBLIC

Method and Objectives

In 1998 a questionnaire [2] was put to the general public. Forms were sent to 4820 randomly selected road users in Belgium. 2507 people answered.

The aim of the questionnaire was to reveal if acceptance of ISA is feasible. The respondents were asked about the use of traffic accommodation, behaviour and attitudes in relation to speed, the experience of speed and speeding and opinions on measures of road safety.

Main Results

Speeding Behaviour and Basic Attitudes

Most of the respondents declared that they never drive to fast in 30 – area's (30 kph) and urban areas (50 kph). When they drove to fast (1 out of 4) it is mostly on highways (120 kph).

A huge majority noted that speeding is not fun, liberating or exciting. Only 1 out of 4 thought that 'driving fast saves time'. More than 8 out of 10 declared that 'a car is only for use of transportation.'

Speed and Speeding as a Problem

8 out of 10 noted that speeding is dangerous and reckless. The respondents were also asked about their 'feeling of insecurity' in different roles (pedestrian, cyclist, car driver or passenger) when they noticed others were driving to fast. Most of the people were insecure in the role of pedestrian and cyclist when others drive to fast, but even 1 out of 2 are not feeling safe as driver or passenger in a car when others are driving to fast.

Road-safety Policy and Measures taken against Speeding

It seems that there is a large acceptance of the implemented speed limits. 1 out of 3 even declared that the speed limits in urban areas and 30-zones are too low. At least 60% accepted the speed limit of 120 kph on highways.

The majority of the respondents agreed that the government should do more against speeding. They even found it as 'very important.' In relation to this question they were asked about the measures taken by the government on speeding. Measures like police controls, cameras, infrastructure and campaigns were noted useful. The most favourite measures were police controls.

According to the perception of the effectiveness on road-safety by these measures, police controls were the most favourite. Campaigns and cameras were found the least effective measures on safety.

The Relation with socio-demographic data and use of transportation

High educated men, younger than 40 use the car the most. Driving fast is mostly done by male young drivers. Frequent drivers see driving fast as less of a problem, and acknowledge that they are speeding regularly, mostly on highways. However they recognize that driving 'too fast' is irresponsible. Regularly car users younger than 40 are less convinced about road-safety measures, but not against.

Can there be acceptance of ISA?

The three topics in the research on carrying capacity of ISA indicated that on average, road-users are 'responsible' drivers aware of the relation between speeding and road-unsafety. They wanted measures against speeding and were mostly in favour of a traffic-safety policy. It also indicated that there is a possible carrying capacity of 'advanced road-safety utilities' especially in relation with speed and speeding-behaviour. Therefore the respondents were also asked about their opinion of an implementation of ISA.

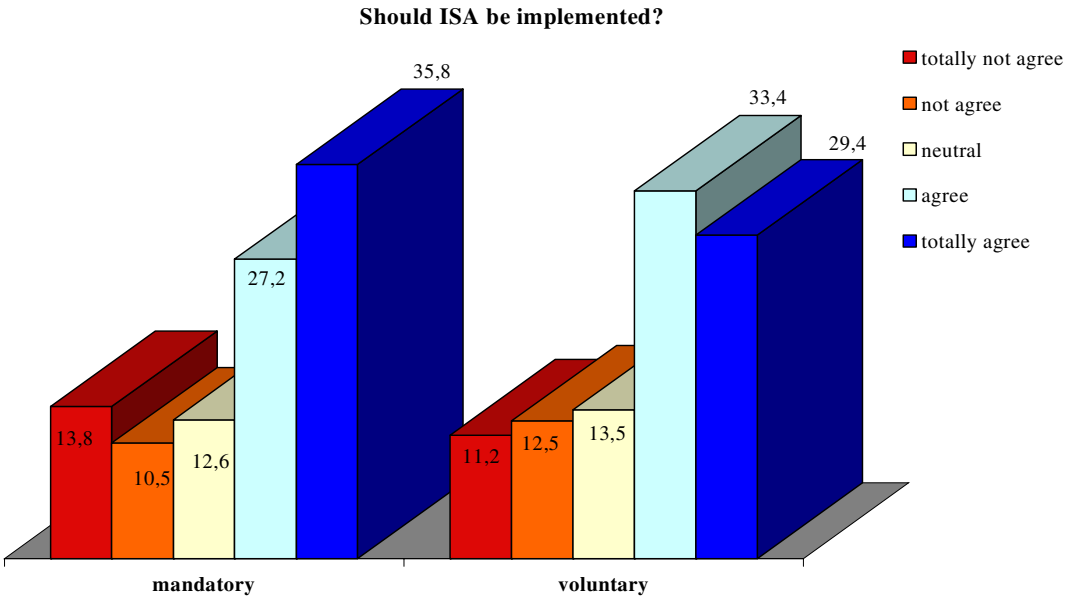

Figure 2 - the general opinion about implementation of ISA

63% of the respondents agreed with an implementation of a mandatory ISA-system. 62% agreed about a voluntary system. Although the mandatory system had got the most resistance (13,8%), more people were in favour (35,8%) of a mandatory ISA instead of a voluntary system (29,4%). This means that there can be an acceptance of ISA by the general public.

THE ISA-TRIAL IN GHENT

Project Description and Research Methodology

According to the results of the large questionnaire a first ISA-trial was introduced in Belgium [3]. It started in October 2002 and ended in January 2004. 34 cars and 3 buses were equipped with the 'active accelerator pedal.' When the driver attempted to exceed the speed limit, a resistance in the accelerator pedal was activated. 80 people volunteered to Install the ISA system in their privately owned car. From those 80, 20 were withheld. For the remainder of this text we will call them voluntary drivers. An additional 17 cars were provided by different kind of companies. The total (restricted) number of test drivers was 62: 42 male and 20 female spread over different ages and different cars.

The test-drivers were interviewed three times: before their vehicle was equipped with ISA, after driving with the system for 7 months and finally at the end of the test-period, after driving for 2 months with a deactivated pedal. The same research model as for the carrying capacity was used but also extended with specific questions about the use, experiences and acceptance of ISA.

Main Results

Basic Attitudes

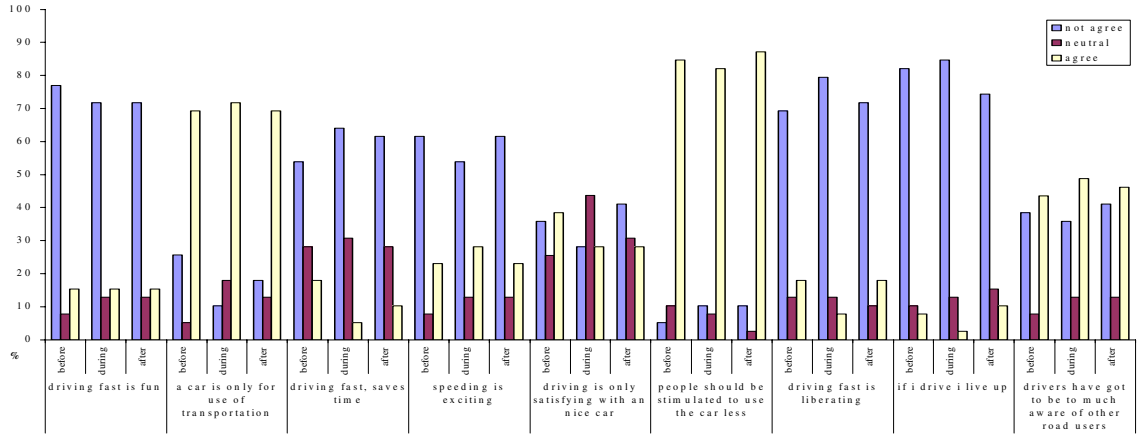

Figure 3 - Frequencies of responses on basic attitudes in percentage.

ISA had a certain effect on the drivers' opinion on basic attitudes. Basically, most of the drivers didn't think that driving fast is fun (average, more than 70%), or exciting (average, more than 53%). Their opinions about these issues did not change dramatically during or after the trial. More people agreed on 'driving fast is liberating' during (79%) than before (69%) or after (71%). More than 75% did not agree with the attitude 'if I drive, I live it up', although this opinion increased (84%) during the trial and decreased (74%) after the trial. Before the trial 1 out of 5 drivers thought that 'driving fast saves time', during the trial only 5% were agree and after the trial, only 1 out 10 thought that 'driving fast saves time'. Before (84%), during (82%) and after (86%), a huge majority agreed that 'people should be stimulated to use the car less' and that 'a car is only a way of transportation' (around 70%). Before the trial, 38% thought that 'driving is only satisfying in a nice car'. During the test most of them (43%) were neutral, while after the trial most did not agree.

Speeding Behaviour

Compared with their speeding behaviour before ISA, the test-drivers declared that they were driving less faster during the project. On highways, the answer on 'never speeding' increased during the project with 49%, outside urban areas with 26%, in urban area with 16%, in 30 area with 7%. The answers on 'regularly speeding and mostly speeding' decreased on most categories during the trial. The answers given after the trial on 'never speeding' stayed level for outside urban areas, in urban areas and 30 roads.

Speed and Speeding as a Problem

The attitudes on speed and speeding were analysed before, during and after the trial. The following possible attitudes were given to the test-drivers: 'speeding is dangerous'; 'speeding

is sportive'; 'speeding is reckless'; 'speeding causes the most traffic accidents'. Although their opinions changed during and after the trial, the most drivers thought that speeding is 'dangerous', 'reckless' and 'not sportive'. The most remarkable changes were about their opinion of 'speeding causes the most traffic accidents': 74% were agree before, 69% during, and 56% after the trial.

The drivers were also asked if they felt safe or unsafe, when they saw other cars driving to fast in different speed areas.

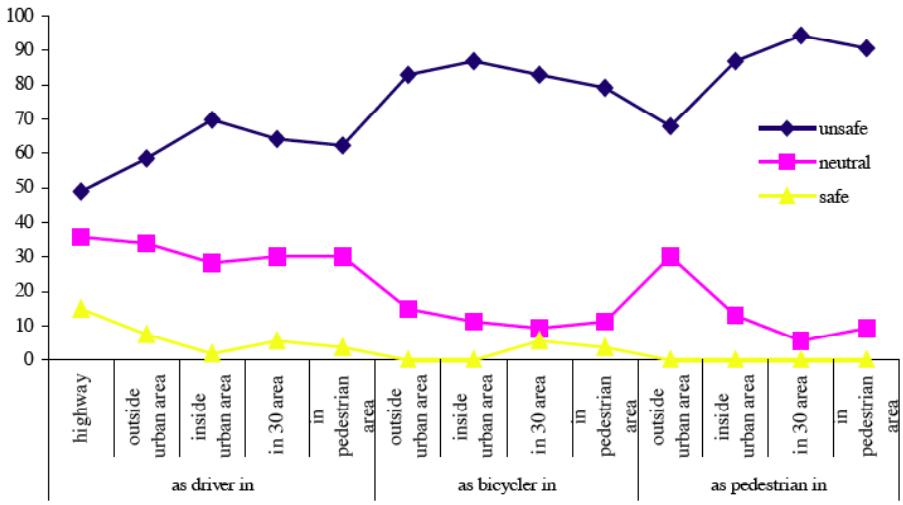

Figure 4 - Frequencies of responses on feeling insecure in different roles and speed areas

The respondents would never feel save as a pedestrian in any speed area when other cars were driving to fast. The test-drivers felt the most insecure as a pedestrian in 30 area (94%) and pedestrian areas (90%). As drivers, 49% felt unsafe on highways, 70% in urban areas when they noticed other cars driving too fast. As cyclist, 87% felt unsafe in urban areas, 83% outside urban and 30 areas, 79% in pedestrian areas.

Road-safety Policy and Measures taken against Speeding

The test-drivers were asked how they thought about the different speed limits in different areas. On average, more than 60% of the drivers declared before, during and after that the speed limits are good in all areas. During and after the trial, more and more drivers claimed that speed limits in 30-areas (23% before, 36% during, 41% after) and pedestrian areas (82% before, 61% during, 51% after) are to low. Main reason was that with the AAP they were forced to adhere to the speed limits in these area. Most drivers said that 'driving 30 or 15 is slow', although they did not want to declare that '30 areas and pedestrian areas are not useful for road-safety'.

The test-drivers were asked two main questions were about measures taken against speeding: how important is it to take actions against speeding in different speed areas and which

methods are the most appropriate?

The test-drivers declared that taking action against speeding in urban areas (53%) is a priority, followed by 30 zones (51%), pedestrian areas (47%), outside urban areas (34%) and highways (28%). The respondents did not think it important to take measures against speeding on highways. The best methods taken against speeding were police controls and cameras, followed by speed bumps. The worst methods were road-safety campaigns.

The drivers' Acceptance of ISA

The acceptance of ISA was measured by three methods [4]:

1) The method used to measure the acceptance was the procedure of Van Der Laan, Heino and De Waard [5]. Acceptance is measured by direct attitudes towards a system and provides research with a system evaluation in two dimensions. The technique consists of nine rating-scale items. These items are mapped on two scales, a scale denoting the usefulness of the system, and a scale designating satisfaction.

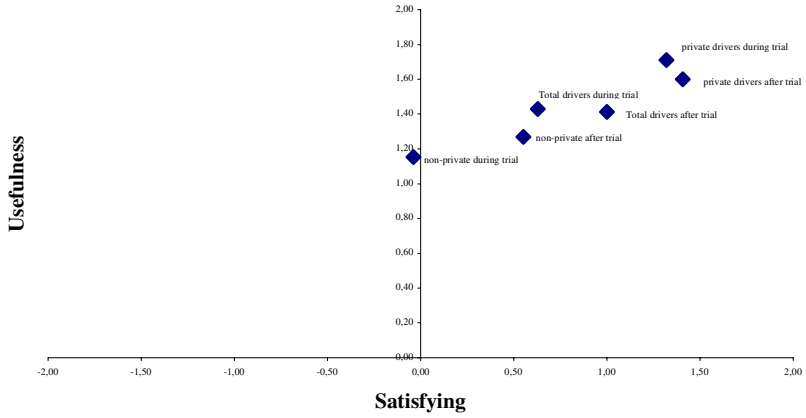

Figure 5 - Acceptance of the active accelerator pedal

All drivers (total) accepted the active accelerator pedal. After the trial they experienced the pedal as being even more satisfying. The most pleased with the active accelerator pedal were the private drivers. During the project they found it more useful but less satisfying than after the project. The most remarkable change is seen by the non-private drivers: while during the project they experienced it was not satisfying, although useful, they declared it was more satisfying and useful after the trial.

2) The drivers were also asked if they used the AAP manually (voluntary) outside the test-areas, and on which roads. Mostly it was used on highways (56% during, 60% after) and outside urban areas (56% during, 50% after), less in urban areas (46% during, 41% after) or 30 roads (33% during and after) outside the test area. This voluntary use indicates a first acceptance.

3) At the end of the trial, the private test-drivers could choose to keep the ISA-system in their car. 15 private car holders chose to keep the system in the vehicle after the test-period which is a significant indication that there is an acceptance of the active accelerator pedal. The main reasons given for keeping the system was that it was assisting, comfortable and relaxed driving.

THE FIRST INDICATIONS TOWARDS A POSSIBLE IMPLEMENTATION

If we compare the public questionnaire with the results of the ISA-trials we notice some similarity in responses: public opinions as well as the drivers are concerned about speed and speeding and note the relation between speeding and road-unsafety. This comparison also indicates that the opinions given by the test-drivers, randomly selected, had a certain similarity with the general opinions about road-safety in the large-scale questionnaire.

According to these 2 studies we can conclude that a carrying capacity exists among the general public in Belgium and the test-drivers in Ghent.

Nowadays more and more questions are asked about how ISA can be implemented, and which is the best way to do it in Belgium? Some research indicates that the use of role-models in the use of intelligent transport systems could be sufficient. Therefore in the Ghent trial role-models [6] were driving with ISA and also this same strategy will be used for a new trial in Brussels.

STEPS INTO IMPLEMENTATION OF ISA

Background

Implementation of ISA must be seen in relation to the possible existence of a social carrying capacity. To this end, a large questionnaire was held and a trial started. Although it was recognised that there can be acceptance by a larger public and with the test-drivers, it was noted that decision-makers, governmental institutions, insurance-companies,… were not that much interested in ISA, mostly because they did not have accurate information about these systems. For example, the trial in Tilburg, the Netherlands, showed that ISA can be effective in road-safety. A Dutch study, a few years later, recognized that on a political level there were still some prepossessions about ISA.

Therefore it was important to develop a good information and communication-strategy to give accurate information which can create an even bigger carrying capacity and awareness by companies and governmental institutions.

Development of a strategy

A good communication plan about new road-safety devices is key for future implementation and acceptance:

1) In the Ghent, project companies, Ghent University, the provincial and the Ghent administration were involved in the project. First of all the participation of these companies can give an impulse to the decision makers and have a role in the safety strategy of companies.

2) Before, during and after the trial, The Centre of Sustainable Development (Ghent University) got its own ISA-car to give demonstrations. Several demonstrations were given to opinion and decision makers.

3) In the trial, some drivers were chosen as role-models. These drivers had a delegating and public function at the council of Ghent, institution or company and were chosen because they could make the communication in the companies about road-safety devices easier, but also they could have a certain influence in the public media, in term informing the general public, decision and opinion makers, but also the use of role-models made it easier to get involvement of the press and media.

The use of a demonstration-car

Giving demonstrations with a car can have more impact than 'speaking about' or 'giving information about' ISA. To experience driving with ISA, can be more convincible, palpable and makes ISA more accessible.

It was noticed that opinion and decision-makers were more approachable if they could use or drive with the demonstration-car.

It is also easier to explain the concept and the effects of ISA; takes most of the prepossessions, like 'ISA restrict the freedom in driving' and the 'big brother-effect' away and makes communication to the general public much easier and effective.

In the last 4 years, more than 350 demonstrations were held: demonstrations given to the press resulted in approximately 25 television reports and at least 50 national newspaper articles. Policy-makers, like the former Belgian prime-minister, Belgian minister of mobility, representatives for the European and Belgian parliament had experienced ISA. Organisations, national and international research-institutes, several officials from city-administrations, the European Union,… had driven with the demonstration-car.

All these demonstrations made ISA well known within different kind of groups. This can lead to a better acceptance and a further creation of a carrying capacity of ISA.

The effects of the use of role-models [7]

It was assumed that ISA could have an 'image-problem.' The use of role-models could take some prepossessions away: policy-makers and the manager of a car manufactory were using the system and were giving 'an example in road-safety.' The use of ISA by decision-makers also made it more debatable within the public opinion. Also, policy-makers were using it first, before they would implement it.

As role-models, the mayor and two aldermen of Ghent, rector and vice-rector of the Ghent University, and the general manager of Volvocars Belgium were driving with the active accelerator pedal during the trial.

In general, the use of role-models during the trial, made the project more interesting among the media like television, newspapers and radio. These interests made ISA better known by the general public, decision and policy-makers, so the carrying capacity was getting larger.

Specifically, the trial and the positive opinions of these role-models in the public media made companies, authorities (like other cities, governmental administrations), insurance companies, institutions,… more interested in ISA.

In the Belgian parliament, commissions were formed and resolutions were proposed and voted to enforce the policy about ISA, sometimes lead in by an ISA-demonstration. The topics of these resolutions were about experiments and trials among ISA, the use of ISA by individuals with a public role and about the implementation of ISA.

Also ISA, became a main topic in the Belgian pedestrian movement's campaign.

According to these resolutions because of the good and positive communication about the trial in Ghent, the former federal minister of mobility asks that a new ISA-trial should take place in Brussels. Cars of different cabinets, parliaments and ministries will be equipped with the active accelerator pedal. The main goal is to be role-models in traffic safety, to create further carrying capacity in Belgium and to take a first step into implementation of ISA. In a next sep, companies could get involved in the trial and even the cars of the European Parliament. Later, individuals and even more companies can participate.

Until now, a first map of Brussels with the data of the speed-limits is already made in a private-public partnership, and a first ISA-car had been tested the map.

CONCLUSIONS

Implementation of ISA also involves taking into consideration how the public opinion thinks about these future measures. Therefore it is necessary to research the basic attitudes of the public, to know if road-safety in relation to speed is an important social topic and how people think about measures taken against speeding. That way, it might be shown that there is enough carrying capacity to guarantee acceptance of an implementation strategy.

This is why trials can be very effective to measure the acceptance of ISA-devices. A communication strategy to every partner involved in a project and to the general public will be necessary to come to implementation.

Having a demonstration-car that can be used by different kind of groups, before, during and after a trial, is an easy and effective communication method: it can make ISA more approachable and widespread.

The use of role-models or individuals with a public function in ISA-driving are giving good opportunities for communication in the media and to increase a carrying capacity and acceptance of ISA. Also the use of the active accelerator pedal by policy makers has been appreciated by the public. Nowadays a political climate has formed in Belgium that can make implementation of ISA possible. This will be resolved in the future Brussels project.

REFERENCES

[1] Van Hoorebeeck, B. (2000), *Meting van het maatschappelijk draagvlak voor intelligente snelheidsbegrenzers (Measurement of a Social Carrying Capacity of Intelligent Speed Adaptation Devices)*. Brussels: Belgisch Instituut voor de Verkeersveiligheid.

[2] De Mol, J., Broeckaert, M., Van Hoorebeeck, B., Toebat, W., Pelckmans, J. (2001), *Naar een draagvlak voor een voertuigtechnische snelheidsbeheersing binnen een intrinsiek veilige verkeersomgeving (Towards a Carrying Capacity on In-vehicle Speed warning Devices within an Intrinsic Traffic Environment)*, Ghent: Centre for sustainable development/Ghent University – BIVV.

[3] Vlassenroot, S., De Mol, J. (2004), Trial on intelligent speed adaptation in Ghent, Belgium: the results on acceptance and driving-behaviour of the test-drivers. In Proceedings *4th European Congress on Intelligent Transport Systems*, Budapest. ERTICO.

[4] De Mol, J., Vlassenroot, S. (2004), Gent: grote aanvaardbaarheid bij de bestuurders (ISA-project in Ghent; Major Acceptance of the Test-drivers ISA-project), In Proceedings *Colloquium Vervoersplanologisch Speurwerk*, Zeist. CVS.

[5] Van Der Laan, J, Heino, A., De Waard, D. (1996), *A simple procedure for the assessment of acceptance of advanced transport telematics*, Groningen:University of Groningen.

[6] Vlassenroot, S. (2004), Intelligent speed adaptation (ISA) in Ghent, Belgium: the first European trial with politicians, academics and car-constructor as role-models in ISA-driving, In Proceedings *10th International Conference on Urban Transport and The Environment in the 21st Century*, Dresden, Wessex Institute.

[7] Vlassenroot, S., De Mol, J. (2004), Voorbeeldfunctie als middel voor het versterken van het ISA-draagvlak (Role-models as enforcement of a carrying capacity on ISA), In Proceedings *Colloquium Vervoersplanologisch Speurwerk*, Zeist, CVS.

More information can be found on http://www.isaweb.be