

# Novel peak hour traffic reduction techniques

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A problem that faces traffic managers across the world is the handling of traffic when construction work is being carried out – the demand for road capacity needs to be carefully balanced with site access to ensure that construction works can be undertaken safely and as quickly as possible, while not impacting the traffic flow any more than is absolutely necessary.

In the Netherlands a novel approach to this problem is being trialled by the Rijkswaterstaat (Dutch Ministry of Transport) with positive results. In this paper we report on the techniques that are being used and the success that is being realised.

## SPITSMIJDEN PROJECT

Spitsmijden (Peak Hour Avoidance) project is operating on the A12 Gouda to Den Haag motorway. This road carries a significant volume of traffic during the peak hour and the surrounding roads by their very nature cannot support the volume of displaced traffic caused by works.

The prime objective of Spitsmijden was therefore to reduce the number of vehicles on the road during peak hour. This was done by identifying the vehicles which regularly participate in the peak hour traffic and encouraging their drivers to change their behaviour.

## APPROACH

Spitsmijden was a multi-phase project. During the first phase ANPR cameras were installed along the target road to identify vehicles that frequently use the road within a designated time period. These vehicles become the target group and their registered keepers were contacted by mail and asked if they would like to participate in the trial. Figure 1 shows the architecture for Spitsmijden.

In the second phase participants undertook to modify their travel patterns by avoiding bringing their vehicle onto the road during defined

critical times. This might be achieved by car sharing, using an alternative mode of travel or by working from home until the peak hour has passed – the project was not concerned too much about the alternative that the participant selects.

Driver compliance is verified by the ANPR system which checks that the participants' vehicle is indeed not using the road at the times that they have undertaken not to. At the end of each month the participant receives a €4 bounty for each day that they avoided the critical periods.

## RESULTS

Whilst it may seem a strange idea to actually pay people not to use their vehicles studies have shown that for large, complex, construction programmes, such as on the A12 the savings that can be achieved by the deployment of Spitsmijden far outweigh the relatively modest cost of implementation.

There are, of course, mechanisms by which the system can be circumvented; using another car, taking another road or by sharing a vehicle. Many of these 'circumventions' do still meet the objective of the system to reduce peak hour traffic and, in general, studies have shown that the level of compliance is high and, in the specific case of the section of the A12 under consideration, there are no easy alternative routes that could be used to circumvent the system.

Spitsmijden demonstrates that if drivers are given credible alternatives to their normal travel arrangements with an incentive to make the change, things can happen to make a difference.

## SPITSSCOREN PROJECT

The SpitsScoren Project is an evolution of Spitsmijden. It was commissioned with three objectives:

1. To reduce traffic flow during peak hours to allow for major reconstruction of the A15.

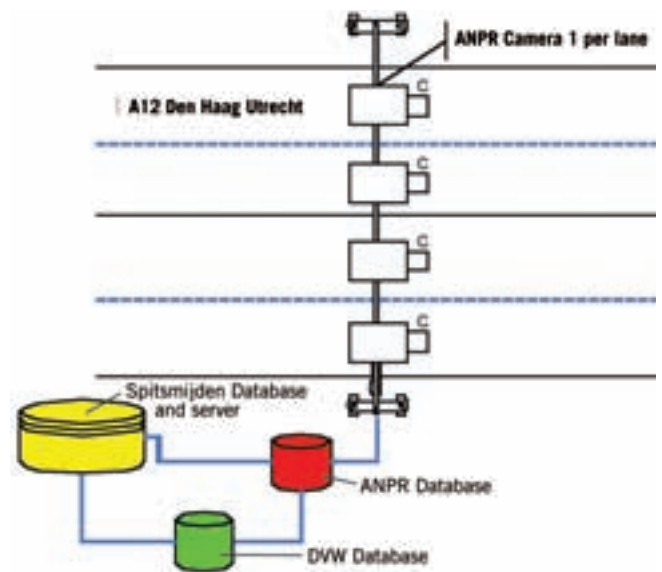


Figure 1: Spitsmijden architecture

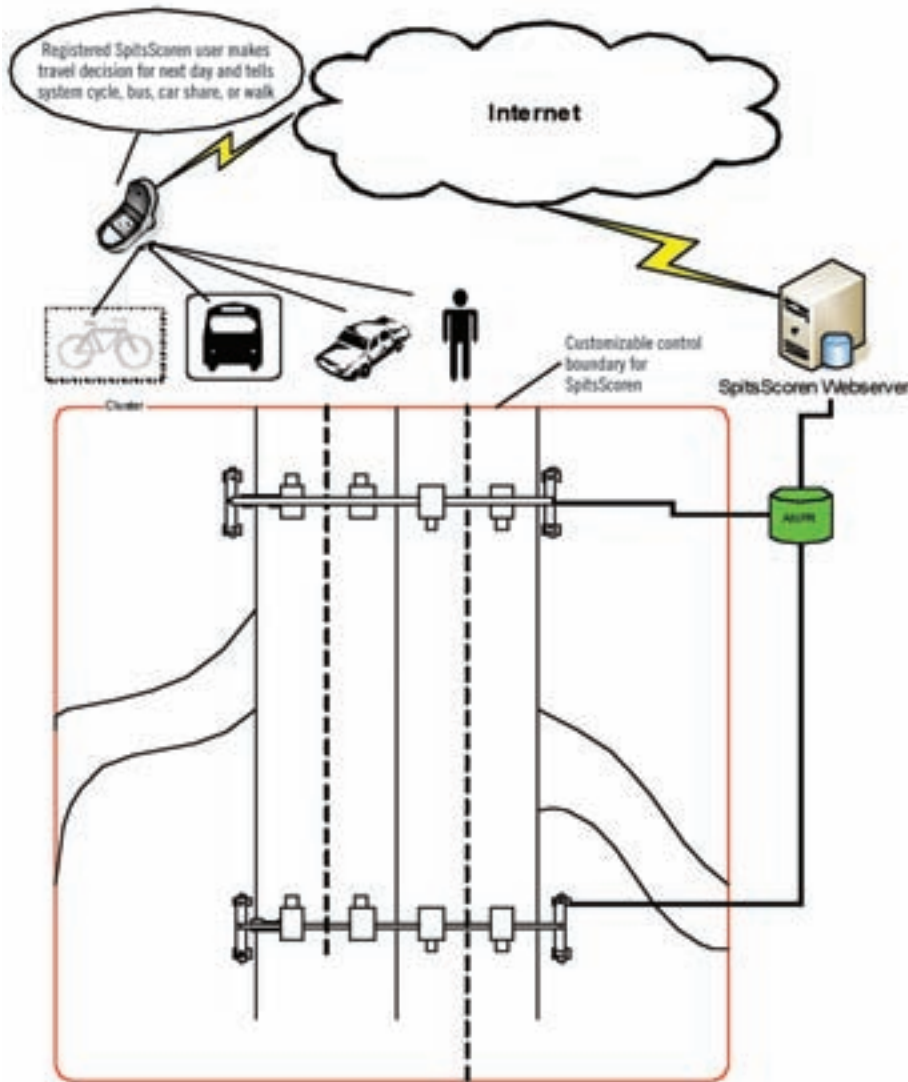
2. To promote modal shift by encouraging a different approach to travel during the peak hours.
3. To prepare the Dutch motorist for kilometre road pricing which is expected to be introduced in the next five years.

## APPROACH

The contract for the project was put out to tender late spring 2009 and won by a consortium in which Technolution is the technology provider. The consortium members are

Figure 2: Map showing SpitsScoren trial route





**Figure 3:**  
**SpitsScoren architecture**

- Technolution (Technical partner)
- ABN AMRO (Dutch bank)
- Goudappel Coffeng (Traffic advisory)
- Movenience (Exploits electronic paying for tolling, parking and other mobility services).

A joint venture established the SpitsScoren Company to execute the project.

The project title was chosen as it has positive connotations in Dutch and a primary imperative for the project was to achieve change in a positive light.

The project approach started off much like Spitsmijden; Vehicles regularly present during the peak hour on the stretch of the A15 in question were identified using ANPR and the registered keepers of those vehicles were contacted to solicit them for recruitment to the project.

The stretch of the A15 of interest for this project comprises the road running from Rotterdam to the Europort east bound only. It is complex area of road network with a number of other potential routes available for drivers to use and the Spitsmijden approach would be easy to defeat. This route's complexity

also meant that ANPR would not be a suitable as the exclusive technique for verification. A more flexible approach to interact with the drivers on a daily basis and to verify their ongoing compliance was required, in exchange for a compliance bounty of €5 per day. Figure 3 depicts the high-level architecture in use for SpitsScoren.

SpitsScoren uses a nomadic (portable) device for the driver to communicate with the project. This type of device supports the project objective of promoting modal shift since it is 'attached' to the user rather than their mode of transport. An Android mobile phone, with its open platform base, was the nomadic device of choice.

Participants receive the device once they have signed a contract to participate in the project for a period of two years. The user interface of the device is used by the participant to nominate their mode of transport for the next day. This is based on information presented by the device coupled with the activities that they need to perform the next day. The information is then entered via the phone, with sufficient detail to allow for verification.

The Smartphone with GSM and GPRS forms the back bone of the verification process by means of tracking the user to verify that they behaved in the way that they stated that they would, eg if the participant indicates that they intended to car share they would enter details of the vehicle used, the registration mark and the registered keeper. For public transport the tram or bus number and approximate time are entered.

The information provided allows for the system to verify that the client has participated correctly in the trial on that day by means of GPS, Cell ID and ANPR tracking. Information is collated and verified by the SpitsScoren servers on a daily basis and payments are made monthly.

The transfer of money to the client takes place on a monthly basis and is an electronic transfer arranged by the financial partner ABN Amro

The scheme recognises that it may not be possible to be fully compliant and avoid the road every day and as such the web interface displays the average avoidance compliance statistics on the web site.

## RESULTS

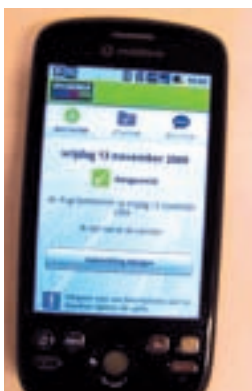
At the start of the project the ANPR data showed the median of the traffic flow during the peak hours was 10,500 vehicles/hour. A target of a 5% reduction was agreed with Rijkswaterstaat which resulted in a requirement for around 530 vehicles per day to not use the road during the peak hour. At the end of November 2009 1,600 handsets had been deployed with an expected total quantity of 2,000 - 2,500 depending on the long term effectiveness of the approach.

The first period of measurement has just concluded. The reduction achieved was 1140 vehicles per day with handset deployment still continuing. The number of handsets registered and deployed by the end of January 2010 had reached 1736

## CONCLUSIONS

These two projects have shown that novel approaches to traffic flow reduction can work, and can deliver practical results. While it may appear counter-intuitive to pay drivers to not use the roads, or to find alternative means of transportation, during certain periods of time, financial calculations do show that this direct approach is considerably more cost-effective than some of the other techniques that are traditionally used.

Although these techniques are 'stand alone' and address specific is-



**Figure 4:**  
**SpitsScoren handset**

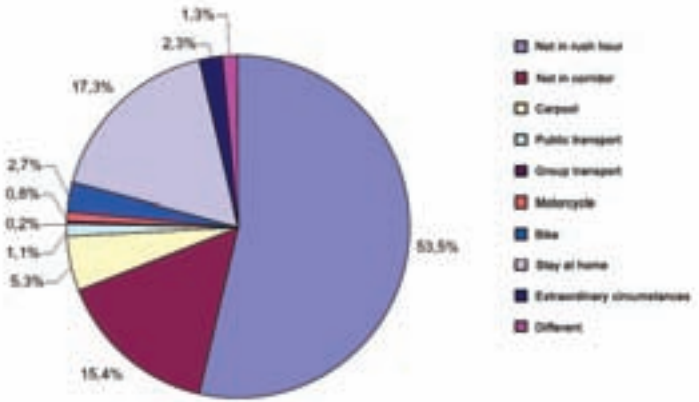


Figure 5: SpitsScoren graph showing avoidance of peak time by choice of mode

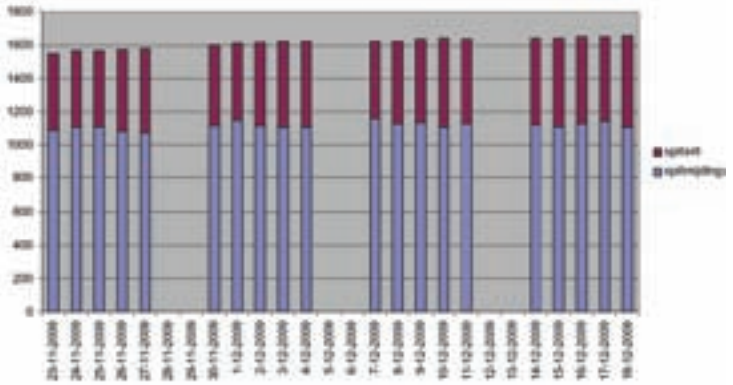


Figure 6: SpitsScoren graph showing number of vehicles removed during peak times in period two of project

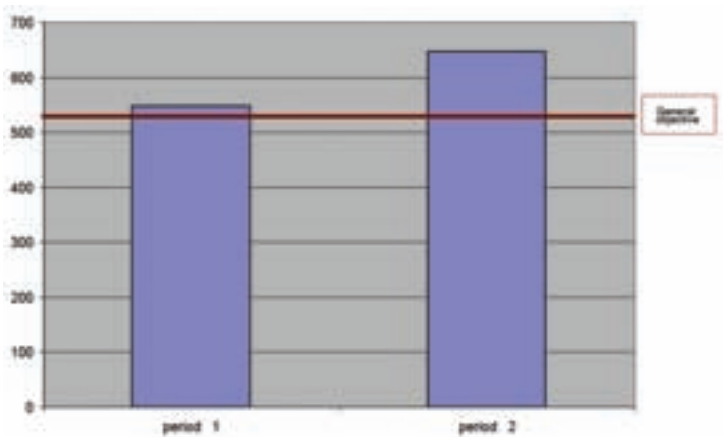


Figure 7: SpitsScoren graph show number of vehicles in period one and two avoiding road during peak time

sues along one single road with specific characteristics, it is easy to see that these ideas could be incorporated into road charging, partitioned lane, prioritised route or any number of other differentiating approaches.

The Spitsmijden and SpitsScoren projects could be the forerunners of different, even revolutionary, approaches to how we handle our road traffic during periods of constrained availability. They have certainly demonstrated their practicality in their trial deployments.

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