

## ITS Radar Helpdesk Query: Electronic Roadside Warning Systems

Query no:	6	Query initiator:	Chris Gould
Date:	20 <sup>th</sup> October 2005	Compiled by:	Chris Metcalf – chris.metcalf@fabermaunsell.com
Query topic areas:	Research carried out by the HA or DfT into Electronic Roadside Warning Systems		
Categories and level of relevance :	Traffic Management Technology	Very relevant	
	Safety	Some relevance	
	Traffic & Travel Information	Some relevance	
	Driver Behaviour	Some relevance	
	Monitoring	Some relevance	
	Standards & Policy	Some relevance	
	Technology Solutions	Very relevant	
Transferability to Highways Agency :	Meets Policy Objectives	N/A	
	Cost/Benefits Information	N/A	
	Development status	N/A	
	Innovative	N/A	
	UK legal issues	N/A	
Summary:	<p>The main electronic roadside warning systems currently in use on the English motorway and trunk road network are gantry mounted matrix signals, MS1s, and VMS (EMS, MS2, MS3 and MS4). These display advisory speed limits and congestion warning messages. On the trunk road network, 'secret signs' are also deployed to warn motorists of potentially dangerous road geometry e.g. bends, and mandatory speed limits.</p> <p>We have found little evidence of research undertaken by the HA into post mounted roadside warning systems, however we have identified research undertaken on 'secret signs' and of course research into MIDAS.</p> <p>TRL undertook a review of congestion warning systems for the TSS Division in 2001 as part of the outward facing research programme. This made reference to VMS for roadside warning and also noted the Road Traffic Advisor project, but made no reference to other congestion warning systems,</p> <p>Faber Maunsell undertook a piece of work for the HA in 2003 which made recommendations on operational management of the trunk road network. This highlighted the merits and potential of secret signs, and COMPANION as possible tools for use on the all purpose network. The report also noted the existing warning scheme at the A64 Bramham Interchange and made reference to TRL research on secret signs.</p>		

### Introduction

This document is provided in response to the above query regarding previous research carried out by the Highways Agency and / or Department for Transport into electronic roadside warning systems.

## **Traveller response to information systems / factors influencing trip-mode choice: Review of current information and congestion warning systems – TRL, 2001**

TRL were commissioned by the HA under work package WP B1 of the Highways Agency's sub-project "Factors influencing trip mode choice and traveller response to information systems", to provide a review of the current information and congestion warning systems available in the United Kingdom. The report predominantly focuses on the systems available to people pre-trip, with detail on the teletext services, the internet and PC-Based journey planners, and in-vehicle on-trip information systems, such as Trafficmaster and Radio broadcasts. Most of the research documented in the report is aimed at the effectiveness of these systems.

There is a section on road-side systems, concentrated on the use of Variable Message Signs (VMS). The report details the aims of VMS and provides a brief summary of the processes needed to ensure that VMS are used effectively. The report notes that early studies conducted within CARGOES, QUOVADIS, MARGOT and TABASCO highlighted that the phrasing of VMS messages affect behavioural response. The QUO VADIS study highlighted that compliance with VMS advice was dependant on the phrasing of the message, the nature of the incident, the position of the VMS relative to the incident and the drivers destination. Much of the research highlighted in the section details human response to VMS information.

The road-side systems section also highlights the 'Road Traffic Advisor Project', which was developing a two-way communication system using dedicated short-range communications (DSRC) that allows vehicles to transmit and receive information at high speeds. Information sources include traffic congestion ahead, traffic incidents and speed limit restrictions, along with conventional information.

## **Operational Management of the All Purpose Trunk Road Network – Workbook – Highways Agency, 2003**

The Operational Management of the All Purpose Trunk Road Network (APTR) project is focussed on investigating the way that the ATPR network is managed and identifies ways in which this could be improved. A workbook produced for the project highlights an electronic roadside warning systems using fibre-optic signs, which is discussed below.

The use of electronic roadside warning systems is identified as a means for increasing the profile of unexpected road features, such as roundabouts, kerbs, junctions and bends. Signs, triggered by loop detectors in the road or radar detectors on the sign, indicate that a particular motorist is possibly travelling too fast for either the speed limit or road layout ahead. This signing is known as interactive fibre optic signing or interactive vehicle signing. The workbook states that a reduction in accidents, low operating and on-going maintenance costs, limited visual intrusion and low energy usage are benefits of interactive vehicle signs. The workbook highlights an in-depth evaluation of vehicle-actuated signs that was carried out by TRL in 2002 to appraise their effectiveness and driver opinion. Results showed that drivers were more likely to reduce speed when targeted with an interactive sign over a static one, and that there was a reduced risk of accidents even if an associated enforcement system (such as speed cameras) had not been implemented.

## **Vehicle-Activated Signs – A Large Scale Evaluation – M.A. Winnett & A.H. Wheeler, TRL Report TRL548**

In this report TRL evaluated the performance of vehicle activated signs across a number of different sites in Norfolk, Kent, West Sussex and Wiltshire. Across all locations the implementation of vehicle-activated signs was found to decrease the mean speed of vehicles in the location and reduce the proportion of vehicles travelling at a speed of 5 miles per hour over the speed limit.

The data collected at the location of speed roundel vehicle-activated signs indicates that they are very effective at reducing speeds on the road, with the range between a 1.2mph and 7.1mph decrease.

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Drivers exceeding the speed limit by over 5mph also fell, with the majority of locations seeing around a 20% decrease in drivers travelling at this speed.

Data collection was also conducted at a number of locations where vehicle activated junction warning signs were implemented. At all the locations the average mean speed change was just under a 3mph decrease with an average of 21.8% reduction in the proportion of drivers exceeding the speed limit at the location of the junction warning signs.

## **MIDAS**

The Motorway Incident Detection and Automatic Signalling (MIDAS) system automatically detects the presence of a slow or stopped vehicle in the traffic lane before automatically setting advisory speeds on matrix indicators upstream and queue warning messages on VMS. There has been a wealth of research carried out by the Highways Agency on the usefulness of the MIDAS system and how to improve the system, particularly the HIOCC (High Occupancy) algorithm.

## **RESEARCH OUTSIDE OF ENGLAND**

The most widely studied roadside warning scheme other than secret signs and VMS appears to be the COMPANION system, developed by BMW and Ruetz Technologies. Three test sites exist, M90 in Fife, Scotland, the A92 in Munich and the A4 in Italy between Brescia and Padua.

An additional 'Guide Light' system is deployed on the Autostrada Brennero in Northern Italy, for use in Fog.

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## References

1. **Traveller Response to information systems / factors influencing trip-mode choice: Review of current information and congestion warning systems – TRL, 2001 (PR/T/052/2001)**
2. **Operational Management of the All Purpose Trunk Road Network – Workbook – Highways Agency, 2003**
3. **Vehicle-Activated Signs – A Large Scale Evaluation – M.A. Winnett & A.H. Wheeler, TRL Report TRL548**