

## **Replacing Road Traffic Signs with a Network of Signalling Stations**

Traditionally traffic control information has been provided to drivers visually by various types of road sign. Recently this situation has been modified by the arrival of 'Satnav'. A vehicle with satnav receives radio signals from satellites (of all things), which it uses to calculate its position and speed. The vehicle has a road atlas stored and, using this and its position, gives the driver routing instructions visually and/or audibly. Recently information on speed limits has also been stored with the atlas and warnings can be given to the driver if these are exceeded. In principle all static information about the road network could be stored and relayed to the driver in this fashion if appropriate. However, the atlas has no access to changing information such as congestion points in the network. This talk discusses the possibility of providing a network of signalling stations that would convey this changing information, together with the static information, wirelessly to the vehicle so that all traffic control information could be provided to the driver in the satnav fashion. These stations would make measurements of traffic flow, volume and speed (and possibly other interesting parameters such as visibility). Speed limits could be varied to reflect traffic conditions. If all cars were fitted with 'cruise control' and a link was made between this and the satnav box, ultimately speed control, i.e. compulsory speed limits, could be introduced. Control of speed is important for maximising flow, particularly at junctions such as roundabouts.

This is not a conference on road networks, so let us assume that we would like to build a network of signalling stations to cover the road network of the UK. These stations would exchange information with the satnav boxes of vehicles. What would be the problems? Most of the network technology required would be to hand. Extensive use of multicast might present some problem and there might well be the danger of overload in the wireless communications between the vehicles and the stations.

Clearly security is a major problem. You may remember the film, 'The Italian Job', and in that the computer only controlled the traffic lights. The problem of bogus stations would be hard to deal with. The 'updating' problem would need to be taken very seriously and in advance. Stations and the satnav boxes would have to be updated and remain compatible. Then there is the 'Big Brother' problem; "you are being watched". This problem seems to have become less serious in the UK. People have rather got used to being watched (congestion charge, video cameras, etc.). However it would be possible to design vehicle identification systems that are deliberately temporary. For example, a vehicle could be given a temporary id when the engine is switched on. This id would only last until the engine is switched off.

At the moment such a scheme of traffic control may seem far off, but the introduction of satnav into road transport will surely be followed by further innovations in the control of road vehicles.

### **Postscript added after the meeting**

There are two types of activity encompassed in the scheme outlined in the talk, information gathering and information distribution. It was suggested that information distribution could be undertaken by the use of digital radio stations. Information could be broadcast to satnav devices to provide an addendum to the road atlas with information of limited lifetime, for example the positions of road works or accidents. It would be interesting to investigate how effective such a scheme could be.

Information gathering is harder. For example, measuring the length of traffic queues is hard and there is no automatic way of doing this that is used in the UK (as far as I know). It was

suggested that this could be done by phone companies tracking the movement of mobile phones. (I have read of this being done in the US.) However this seems to be rather a 'sticking plaster' method. Perhaps the satnav boxes could give out a signal that would allow their position to be tracked. Or possibly satnav boxes could send and receive SMS messages sent on a dedicated service. Clearly there is no shortage of possible technologies!

Are these topics interesting enough to encourage further investigation?

John Burren, Oxford Brookes University