



Hard Shoulder Monitoring System (HASMOS)

In support of the UK Government's 10-year Transport Plan, the Highways Agency is developing the Active Traffic Management (ATM) concept. The principal aims are to reduce traffic congestion and improve journey times, whilst maintaining safety without the need for carriageway widening. At the heart of the scheme are Operational Regimes (OR), which define the ways in which traffic can be managed. One of the main ORs is the controlled use of the hard shoulder as a running lane during certain traffic conditions (incident management, congestion). Maintenance of safety requires that the hard shoulder be checked for any obstructions that could pose a danger to moving traffic, such as stationary vehicles, debris and people.

SEA's HASMOS (HARd Shoulder MONitoring System) project was a prototype development utilising outputs from inductive loops and video cameras positioned along the motorway. SEA has developed data fusion techniques, combining the data from the different detectors to determine if there are any obstructions on the hard shoulder and to notify the traffic control officer. Obstructions of interest include stationary vehicles, debris and pedestrians.

In order to evaluate the data fusion algorithms SEA has developed a motorway traffic simulation model. There are two main aspects to this simulation: the driver behaviour in response to the traffic state, and the response from detection sensors due to the traffic moving along the motorway. A microsimulation approach has been taken. Each vehicle is modelled as a separate entity which follows a set of rules dependent on the driver's behaviour (for example desired speed) and the state (speeds and positions) of the other vehicles on the motorway. Overtaking and speed management behaviour are simulated, and the vehicles will respond to incidents such as a breakdown or an obstacle appearing on the road. The simulation is valuable for development and testing of data fusion algorithms, providing a cost-effective "what if" capability to de-risk future engineering work.



In 2008, SEA was awarded a contract to develop a radar-based version of its HASMOS hard shoulder monitoring software as part of a demonstration system being implemented by the Highways Agency and WSP. The system will be installed on a single link of the Northbound M42 and will process data from eight radar sensors in real-time. HASMOS data fusion algorithms will detect incidents on the hard shoulder and minimise false alarms by combining measurements from adjoining radars. Whilst installed, the system will be assessed for accuracy using a video based ground truth system.

