PROJECT

MUSIC

Management of Traffic Using Traffic Flow Control and Other Measures

Funding: European (4th RTD Framework Programme)
Duration: Jan 1996 - Feb 1999
Status: Complete with results

Background & policy context:

Congestion, pollution and car accidents are widespread in industrialised countries as well as in developing ones. However, electronics and computing have advanced so much as to make possible new conceptions of transport infrastructures and movement systems that can reduce pollution and lead to a better management of urban transport systems.

Objectives:

MUSIC aims at showing that innovative, cost-effective methods of traffic control can be used to assist management of urban travel in order to:

- reduce congestion;
- improve efficiency, especially that of public transport modes;
- reduce pollution;
- influence transport choices.

MUSIC also aims at demonstrating that software can be used to design and assess traffic signal timings in order to achieve network-wide benefits. As the MUSIC development utilises existing traffic signals, it will provide a cost-effective approach that can be widely adopted in towns and cities.

Methodology:

The project will involve:

- Construction of reliable simulation models and development of novel traffic management and control strategies for three demonstration sites, Porto - PT, Thessaloniki - GR, and York - UK.
- Demonstration that novel methods of traffic control can be used alone or in combination with other measures (park & ride, re-allocation of road space to public transport, road pricing, information), in a cost-effective manner in order to reduce congestion, improve efficiency/cleanliness of urban travel and influence modal choice.
- Dissemination of project results so that developed methods may be adopted throughout the EU to exploit the benefits of the research.

Parent Programmes:

FP4-TRANSPORT - Specific research, technological development and demonstration programme in the field of transport, 1994-1998

Institute type: Public institution

Institute name: European Commission; Directorate-General for Energy and Transport (DG TREN; formerly DG VII)

Funding type: Public (EU)

Partners:

University of York - Department of Mathematics; Hague Consulting Group; Trias SA Consulting; University of Porto - Faculty of Engineering.
Key Results:

The project has developed a low cost approach to the design of traffic signal timings across an entire road network, and demonstrated it in three European cities. Details of the methodology have been published in a handbook. The methodology uses existing network models of city traffic, and provides new timings to programme the existing set of signals.

In York, traffic timings were designed to enhance the benefits of a new bus lane on a Park & Ride route. As a result, bus journey times decreased and reliability of travel time increased. Peak-hour patronage increased by 25% during the test period, while remaining constant on the city's other Park & Ride routes. The data showed that the benefits were due to the MUSIC timings and not the associated changes in infrastructure.

In Thessaloniki, timing plans were calculated for 129 traffic signals, and gave a measurable reduction in congestion. Similarly in Porto, delays to vehicles on certain routes were reduced. However, not all objectives were met in these two cities, partly because not all the traffic signals could be adjusted as desired. The results of the on-street demonstrations strongly suggest that drivers do change their routes in response to traffic signal timings. It is therefore vital that design tools for traffic plans take this into account. The re-routing process may take more than one month to complete, which has to be considered in any before-and-after evaluation.

Policy implications

It is clear that traffic signal control has great potential to be used as a low-cost tool for traffic demand management and the achievement of related policy objectives. The MUSIC approach can be transferred to other towns and cities that have an existing traffic network model.

The project highlighted the need for traffic control policy to take account of drivers’ route choice behaviour in response to policy implementation. Most traffic modelling tools currently available either take no account of re-routing or make the assumption that drivers re-route until a new equilibrium state is achieved. MUSIC showed that equilibration is a very slow process, and that more research is needed in this area.

Related Projects:

- AIUTO - Models and methodologies for the assessment of innovative urban transport systems and policy options.
- HIPERTRANS - High performance transport network modelling and simulation.
- INCOME - Integration of traffic control with other measures.

STRIA Roadmaps: Network and traffic management systems, Smart mobility and services

Transport policies: Decarbonisation, Societal/Economic issues