



Traffic Simulation

A number of factors can influence the flow of traffic on the roads: accidents, road works, and peak demand flow levels. There are a number of different strategies that can be adopted to limit traffic congestion and reduce delays. However it is not always a simple task to decide which strategy would be most effective for a particular scenario.

Business Problem

TRL Limited provides research, advice and solutions on all transport issues. TRL works with governments, international funding institutions and private companies.

TRL has developed a model for motorway traffic flow, called Simulation of Strategies for Traffic on Motorways (SISTM), to assess the effect of different road layouts, driver behaviour and increased traffic volume. The Highways Agency owns the IPR of SISTM and funds other organizations to develop it further. TRL is the main user of the SISTM model, a microscopic traffic model simulation that dynamically models ramp metering and variable speed limit systems, takes into account shockwaves and exit management, and allows the operation of those systems to be dynamically modelled in real time. A feature of SISTM is that it incorporates a model of drivers' psychological behaviour (e.g. aggressiveness and awareness) and different vehicle characteristics (e.g. acceleration rates and top speeds).

Tessella Solution

Tessella has helped TRL improve SISTM's simulation engine, written in FORTRAN. This involved updating the calculations to use real precision in standard units. Tessella also examined the use of incident detection algorithms to model statistical properties of traffic flow which could be calibrated to respond to flow breakdown.

The model is used on sections of the M25 motorway to dynamically impose speed restrictions in an attempt to improve the driving environment.



Results and Benefits

Simulation of Strategies for Traffic on Motorways has been used to model traffic behaviour, and generate statistical outputs such as journey times and average speeds on the M25, the most congested UK motorway. This helps the Highways Agency plan ahead to determine the most suitable action to take in the event of an incident or road closure, in order to minimize the effect on the overall flow of traffic.

One of the benefits of the quality standards Tessella applies to software development is that it supports the future efficient development of the application by other groups of developers. SISTM has since had 3D graphics added in C++. The Highways Agency have recently returned to TRL for three years' further development of SISTM. This includes refinement of the core FORTRAN implementation of the traffic modelling algorithms and other enhancements.

Tessella plc 26 The Quadrant, Abingdon Science Park, Abingdon, Oxfordshire OX14 3YS, UK
T: +44 (0)1235 555511 | F: +44 (0)1235 553301 | E: info@tessella.com

Tessella Inc 233 Needham Street, Suite 300, Newton, MA 02464, USA
T: 1 617 454 1220 | F: 1 617 454 1001 | E: info@tessella.com

Tessella – successfully delivering IT and consulting services to world leaders in R&D, science and engineering.

For decades, Tessella has been successfully delivering IT and consulting services to world leaders in R&D, science, and engineering. Through the application of scientific methods and rigorous quality procedures, we enable clients in life sciences, energy, the public sector, and consumer industries to achieve a wide range of objectives, including, forecasting floods, developing fusion power, enhancing military sensor capability, increasing drug discovery and development efficiency, and reducing risk to health and the environment in the extraction and production of oil and gas. With offices in Europe and North America, global companies rely on Tessella for business critical assignments.

Copyright © Tessella plc 2009, all trademarks acknowledged.

