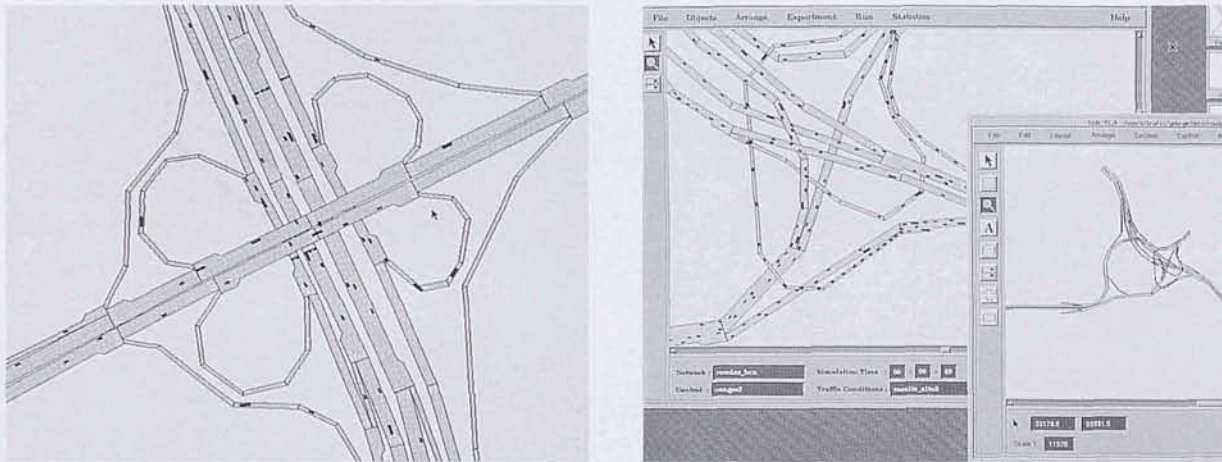


# THE APPLICATION OF NEW TECHNOLOGIES TO ROAD TRAFFIC



THE NEED TO COME UP WITH SPECIFIC COMPUTER TOOLS FOR TRAFFIC CONTROL AND MANAGEMENT HAS IN RECENT YEARS BECOME CLEARER THAN EVER. THE GROWING MOBILITY OF GOODS AND THE LIMITATIONS OF ROAD INFRASTRUCTURES ARE TWO KEY ELEMENTS FAVOURING RESEARCH IN THIS FIELD.

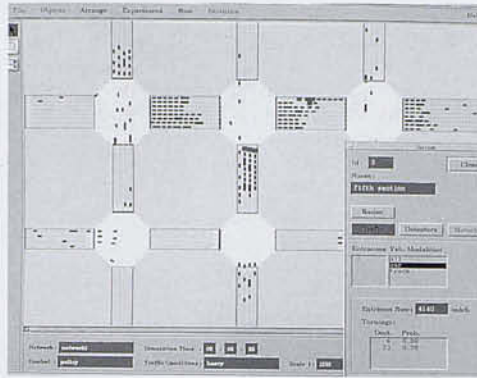
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**I**n the last ten years the increase in motor traffic and in the movement of goods and people has been explosive, and it is foreseen that this trend will continue in the immediate future. In Europe, particularly, new inter-regional flows will arise and existing ones will increase. These forecasts contrast with the shortcomings experienced in the European transport system, which tends to give rise to safe-

ty problems and delays as a result of congestion. Possibilities for increasing traffic capacity in the large metropolitan areas are very limited; the solution to these problems requires the application of new information and telecommunications technologies. The first European programme aimed at solving traffic problems was the PROMETHEUS –later discontinued–, a private programme developed in the

framework of Eureka by the large car manufacturers. Spain was left out of the programme because when Prometheus started it was not yet part of the European Union. In view of this isolation, a group of Spanish companies later created the firm ISU to promote the EURO-POLIS project within Eureka. In 1987, ISU contracted as scientific adviser the Transport Study Group of the Department of Operative Statistics and Inves-





tigation (DEIO) of the Polytechnic University of Catalonia (UPC). After an almost exhaustive investigation, the group singled out four main areas of development in the field of road traffic: transit and transport information systems; traffic management systems; transit control systems (all three in real time) and hardware and software support tools.

In 1988, the Committee of the European Union started its programme DRIVE. The aim was to improve traffic safety, make the use of the road network more efficient and reduce the impact of traffic on the environment. This programme filled the gap left by the abandonment of Europolis. The Transport Study group at the Polytechnic University of Catalonia's DEIO presented various proposals along with other countries. Between 1989 and 1991 the Catalan study group took part in the following projects:

**ASTERIX:** (A Simulation Tool for Evaluating Road Transport Informati-X). Centred on the effect of applying new technologies. The aim of Asterix was to show that systems simulation by computer could be used to analyse the new traffic scenarios. A software environment was built that was of use in the construction of simulation and traffic models which allowed the use of different simulators according to the characteristics of each problem. Taking part in this project, which was co-ordinated by the UPC Study Group, were the Institute for Transport Studies at Leeds University in England, the Italian Centro Studi sui Sistema di Trasporto and the University of Bremen in Germany, amongst others.

**SOCRATES** (System of Cellular Radio for Traffic Efficiency and Safety). Centred on how to get information to the user in real time. In an initial stage, the Socrates programme has designed a guidance system based on mobile digital communications technology called GSM, combined with an independent navigation system with incorporates a computer with a digitalized map of the road network and which will become the standard European system in the coming years. The UPC Study Group was responsible for designing these systems, evaluating their impact and estimating the potential benefits according to the conditions under which they are introduced. Taking part in the project were British Telecom, Philips, Daimler-Benz, Volvo and others.

**V1015** (Artificial Intelligence Based Systems for Traffic Control). Centred on the use of artificial intelligence technology for resolving traffic control in real time. A consortium made up, amongst others, of the Barcelona group, the University of Nottingham and the company Control Tráfico, it has experimented and developed the expert system CLAIRE by simulation.

Control Tráfico, a member of the SICE group, contracted the group at the Department of Statistics and Operative Investigation at the UPC to develop a traffic control system able to adapt itself to different traffic flows. This system, called CARS (Control Autoadaptivo de Redes Semaforizadas), decides on the best control policy when it

is fed the relevant parameters in real time (length of queues, free spaces, etc.) and forecasts short-term developments in the traffic.

The European Union's Drive programme is at present at the field-test stage. The UPC group takes part in it with various projects such as GAUDÍ, whose purpose is to experiment with electronic management methods (automatic urban tolls), and ARTIS, which is continuing experiments with artificial intelligence, this time in an interurban environment. The Study Group's participation is based mainly on the application of simulation tools it has developed in previous projects. Amongst these tools are the following:

**GETRAN**, a software environment for the construction of transit simulators that can interact with the data stored in a geographic information system.

**AISUM 2**, a microscopic traffic simulator of very advanced design, aimed specifically at the treatment of network technologies applied to transport, which makes it particularly versatile.

These two tools, used in other international projects such as the SAVE programme for the study of energy saving and polluting emissions, are the nucleus of the participation by the Study Group at the Department of Statistics and Operative Investigation in TRYS, a project developed in partnership with the Polytechnic University of Madrid and the University of Valencia. The second generation expert system developed by Trys is intended to be the nucleus of an intelligent decision-making system for the management of infrastructures such as the Barcelona ring-roads. ■