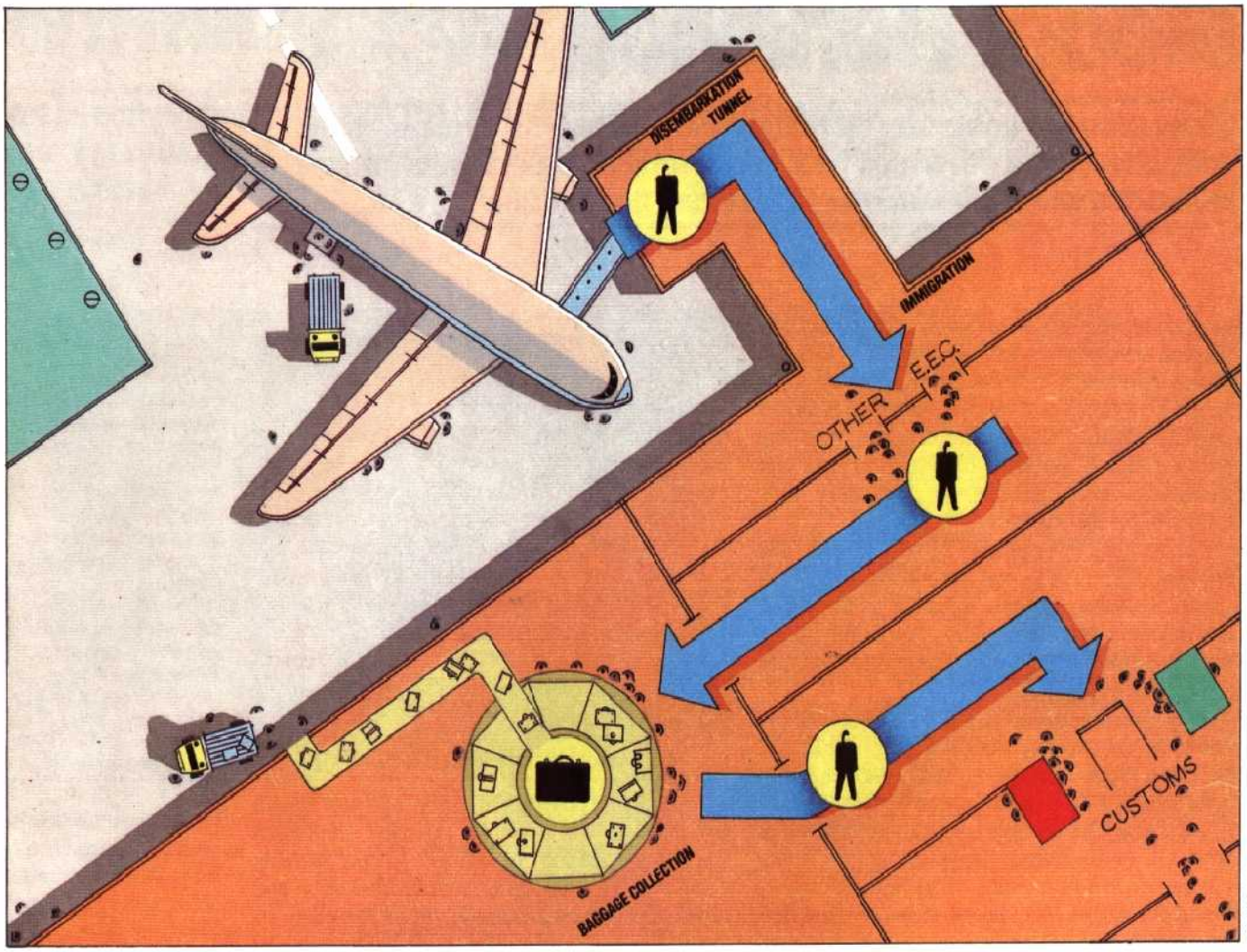


ROY INGRAM

Jumbo-Sized Problem
Computer simulation was extensively used in the design of the new Terminal 4 at Heathrow. The program first had to simulate the pattern of aircraft arriving throughout the day, with varying numbers of passengers and suitcases. It then simulated the 'processes' through which the passengers must pass. The model checked that the system could cope with the expected volume of traffic, and suggested optimal planning measurements

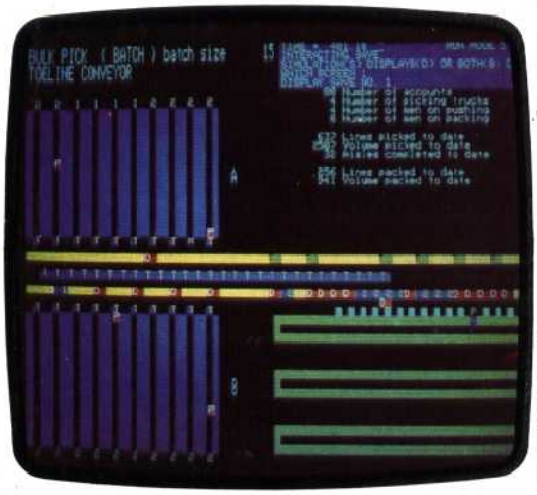
suggests we are at the centre of the universe. But if we adopted an earth-centred model of the universe, we should be misled — as an alternative model shows. If you splatter ink spots on a rubber balloon to represent stars and then inflate it, every ink spot will recede from all the others, yet none is at the centre of the balloon.

However, there are many advantages in using models. They help to formulate better theories, they speed up analysis, they allow modifications to be tried and, most importantly, they are cheaper than the real thing. Their use also allows for creative leaps of theory. The laser, for example, was invented by someone pursuing an aspect of a mathematical model that had been previously overlooked.

BL Systems, a subsidiary of British Leyland, market a multi-purpose simulation system that was originally developed for the design of production lines and automated warehouses at Cowley and Longbridge. The system is called 'See Why' and uses graphic displays to show results rather than the traditional lists of statistics. The system has sold well and has been used by the British Airports Authority to model the new Terminal 4 at Heathrow.

A typical problem that a simulation system can deal with is queuing. At an airport, for example, if the wind suddenly changes and only one of the landing strips is available, the aeroplanes will have to queue. The planes have only a limited reserve of fuel on board and it takes a specific length of time to land each plane. Rules of queuing will be programmed into the system. In these simulations random number generators (see page 209) are used to create unexpected events, such as random arrivals of aircraft.

Simulation is an important application area for digital computers and has even spawned new languages that have been specially written for simulation projects (for example, GASP, SIMSCRIPS and GPSS). As the world grows more complicated, the use of models to simulate problems will become more important.



COURTESY OF BL SYSTEMS

See Why
BL Systems, a division of British Leyland, developed a microcomputer modelling package for designing their new production lines and plants. The package, called 'See Why', has since been sold commercially. Although the emphasis of the program is on modelling processes, it does feature graphical output in the form of schematic diagrams. Numbers by the side of each stage in the process indicate how the work is progressing, and highlight any problems