Reality check for planners

A virtual-reality model is being used to help create Wolverhampton's proposed new transport gateway. **Paul Grayston** explains the advantages of this approach.

The Wolverhampton Interchange is an ambitious regeneration project which aims to create a memorable and easy-to-use gateway for users of the city's transport infrastructure. Led by Wolverhampton City Council, the project will replace existing rail and bus station architecture, remodel local roads, improve transport links, prepare for the Midland Metro extension, and maintain a navigable canal waterway through the area.

Among problems faced by travellers to the city at present are the poor links between heavy and light rail, buses, taxis and personal transport, and the lack of information to guide them as they change between modes. Poor information impacts on journey quality, especially for those with mobility problems.

Working with Wolverhampton council, Atkins is using virtual-reality techniques to model preliminary designs for the new interchange, and develop an information strategy to test various journey scenarios.

This approach enables the city to visualise and assess traveller interchange and 'smart' passenger information systems before they are installed.

Findings from surveys, focus groups, research and site visits were used as a basis for the model, which demonstrated the proposed integration strategy. This took into account both intelligent passenger information systems and static information such as signing and timetables.

Various types of information indicator, kiosk information points and wi-fi hotspots were located within a conceptual design of the proposed interchange. Actual timetable information was fed to the signs in accelerated real-time, giving a sense of realism.

Concepts from best practice inspection visits were incorporated into the model too, and have influenced the overall architectural design. Notably, the VR model has resulted in an additional indoor information point being incorporated in the masterplan for the interchange.

The VR model has also been used as part of the Wolverhampton Interchange project publicity and awareness campaign, in order to help justify and secure further funding for the infrastructure.

Work on the model also forms part of the European Commission's LiRa2 'seamless journeys' project, and includes a study to determine how best to convey travel and interchange information. So, Atkins' team also examined potential information systems and studied real examples of best practice and the use of display technology *in situ* at various locations in Europe.

Consequently, for base information, the model uses AutoCAD, MOSS files, aerial photography, pictures of the interchange site, artist impressions, photos from best practice site visits, and files from the fly-through movie, created for the rail station development.

From this information, the 3D virtual walkthrough model was then developed in order to test identified scenarios and optimise information system performance. The model uses the programming language VRML, and can be viewed on a PC.

Users were invited to 'go' anywhere in real-time, so Atkins could determine the effectiveness of the inter-modal links and information systems – and the company's work on timetable databases enabled the model to provide real service details on the indicators. This was seen as crucial. Without it, there was a danger that any demonstration of the model would be overwhelmed by a discussion of whether or not a bus served a destination.

The virtual-reality model has produced something that is novel, both technically and visually. The initial impact on the first time user is that it is similar to the output of a traffic micro-simulation. Buses and trams realistically move through the interchange halting at their stops.

On closer inspection, however, users see clocks are ticking away in synchronism, and real-time passenger information indicators are changing as services are expected and then depart. The large displays show real service numbers going to the correct destinations in mode-specific or multimodal combination.

Using the mouse moves the viewpoint to allow the user to 'walk' though the proposed interchange. Passing certain points within it, 'hot-spots' are activated and mock-ups of personal digital assistants and mobile phone screens show how journey information can be checked using wi-fi, SMS and Bluetooth connectivity.

Looking around, CCTV cameras, help points, and a range of information posters and fingerpost signing can be seen. On approaching information desks and ticket machines, windows pop up telling visitors how to how to use the interchange, and what tickets are available.

At the information pillar kiosks there is a mock-up screen where people can check the next five departures to and arrivals from any destination, whether it be a rural bus stop, a mainline station or an address by all modes. At the Internet payphones, the default screen is the Transport Direct journey planner, which – when the model is connected to the Internet – is usable.

Overall, the effect has been stimulating for the interchange project. Plenty of 'what if we did this'-type comments have been generated, and safety issues for the construction scheme designers to consider were easily highlighted.

Translating the concepts into three dimensions and adding the information infrastructure has made understanding how people will use the interchange more tangible. Planning for the construction of the tramline several years ahead, and the effect of its operation, has been dealt with in advance – as far as the needs of information provision are concerned.

Unlike a 'fly-through movie,' this asset can be modified cheaply, as the master scheme progresses. The advantages of constructing the model at the pre-build stage are clear. The concepts behind the ITS provision for the whole interchange are now easy for infrastructure designers to understand.

The hope for the interchange is that it will enable effective passenger transfers between bus, rail, tram, coach and taxi for those arriving or departing – whether on foot, in wheelchairs, on cycles, motorbikes, cars, taxis, or even by canal – all guided by 'smart', modern information systems.

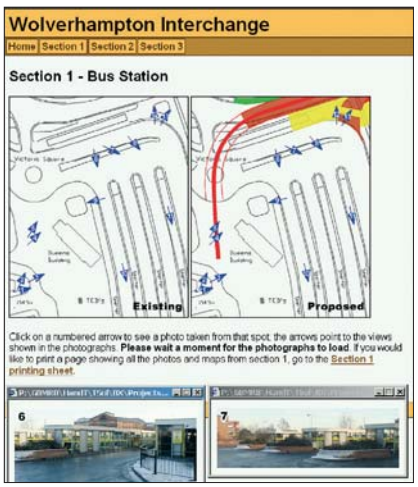
• **Paul Grayston** is principal consultant, transport systems at Atkins.

This still from the VR model shows the three mode themed information hubs concept which resulted from the project. The infrastructure design has now been modified to incorporate the central hub – something that would not have been considered without this project

Screenshot of a 'virtual' multimodal indicator screen within the interchange. It was considered essential that real services to real places should be shown on the indicators to make the model convincing

All of the clocks in the interchange VR model are synchronised. By interfacing with the actual timetable data, the right services are shown for each of the departure stands in 'accelerated real-time'

Above and below: Views of the existing bus station, and how it is envisaged in the RV model



A simple web interface was used to document photo surveys and overlay the viewpoints on plans of the existing and proposed interchange

Artists impression of the new Wolverhampton rail station

Interior of the rail station in the VR model showing displays