



Synthetic Environments and Systems Simulation

A synthetic environment is a representation of a natural or artificial environment, which can include terrain and terrain features, certain localized features of the environment and models of objects. The components that make up the synthetic environment can have attributes (such as physical behaviour), relationships and constraints, enabling complex interactions to be automatically generated and studied. Synthetic environments are of growing importance in the aerospace sector, for example with applications in the prototyping of aerospace systems and air traffic management.

The University of Manchester is making a major contribution to the development of synthetic environments and systems simulation, with particular emphasis on:

- Human-computer interaction
- Agent based computational modelling
- Optimisation and design of complex aerospace systems
- Frameworks for coupling software applications
- Computational steering and interactive simulation
- Knowledge/information management and datamining
- Scalable computing from desktop to supercomputers
- Grid computing policy and management
- Technology for collaborative working

- Developed the RealityGrid library, a generic tool for computational steering on the Grid, winning several international prizes
- Collaborated in a large multi-partner EU project to develop Divipro, a system for distributed, interactive virtual prototyping

Research areas

UMARI is unique in that it can leverage expertise at three levels:

- Pure research
- Service provision
- Technology transfer

The School of Computer Science undertakes fundamental research in all of the areas outlined above, with particular champions of this theme being the Advanced Interfaces Group and the Centre for Novel Computing. The University of

Manchester is one of the few universities in Europe that maintains a capacity to provide leading edge technical support for scientific and technical computing. The Research Computing Services Group comprises around fifty technical experts whose mission is to help engineers quickly benefit from breakthroughs in technology. Knowledge gained through research is quickly put into practice through the development of software and standards, as well as the provision of consultancy and training.

Research facilities

The School of Computer Science and Research Computing Services have at their disposal a wide range of supercomputing, visualisation and collaborative working facilities. These include the following:

- Bull Novascale supercomputer
- Dedicated visualisation supercomputer
- Widescreen stereo visualisation theatre
- Portable 3D stereo visualisation equipment
- Haptics force feedback systems
- Access Grid meeting rooms

Relevant postgraduate study

Taught programmes

Taught postgraduate programmes in the School of Computer Science prepare the student for either a career in industry or research. There are many Masters Degrees to choose from, including Advanced Computer Science, Information Systems Engineering, Sensors and Electronic Instrumentation and Software Engineering. These courses are modular and the students can choose from a diverse range of subjects.

Research degrees

Student research degrees are offered across the broad spectrum of computer science and engineering, from fundamental theory and innovative technology, through novel hardware and software systems design, to leading-edge applications. Few universities in the world are able to offer the same breadth of expertise.

Academic staff



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