

# SIMULATION

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**The border between interactive simulation and digital modelling is blurred.**

When a user interacts in real time with the information on which he/she is working, it is more appropriate to talk about immersive simulation. With immersive simulation it is also possible to observe and “manipulate” virtual objects, assess their aesthetic or ergonomic design, and reproduce real-life user scenarios.



› Safety

› Environment

› Life on board

› Mobility

› **Competitiveness**

## BASIC FACTS

**Virtual simulation** creates a computerized replica of the real world where it is possible to manipulate and interact with things that exist only as computer-aided design (CAD) files in PCs.

With virtual simulation it is possible to validate technical, ergonomic, and aesthetic features without having to build a prototype.

For example, Renault long carried out track trials at night to test its lights and headlamp units. The test vehicles had to be fitted with new equipment then drive numerous night journeys to test the lights in a wide variety of driving conditions. Furthermore, some tests, like visibility in foggy weather and heavy rain were directly linked to the whims of real-world weather,

so impossible to plan. Since 1999 such tests are all simulated. A computer can use mathematical models to replicate different lighting solutions and a wide variety of weather conditions and road landscapes. It is also much easier to modify simulation parameters than a prototype. Simulation offers enormous time gains over conventional testing practices.

## IN SHORT

ALTHOUGH IT FLOWS FROM COMPUTER-AIDED DESIGN AND DIGITAL COMPUTATION, SIMULATION IS DIFFERENT FROM THEM IN THAT IT IS INTERACTIVE. USERS CAN MANIPULATE AND INTERACT WITH OBJECTS AS IF THEY WERE REAL.

Virtual modelling, too, has entered the world of simulation. An extension of 3-D imagery and CAD, it has introduced interactiveness and added the realism of colours and textures. The user can, like an observer, walk round a vehicle as if it was really there and even operate some parts, like hatches,

doors, and seats. To assess life-size virtual models Renault has two simulation viewing rooms. One seats 20, the other 40. Spectators don polarized glasses to view images in 3D on wide screens. The rooms are large enough for life-size physical prototypes to be shown, so making

it possible to compare the virtual prototype and any changes made to it with the physical prototype. Finally, driving simulators replicate real-life driving conditions so making it possible to assess a vehicle's overall ergonomic design and the relevance of its driver assist systems (see "Ultimate").

## HOW DOES IT WORK?



**Simulation requires enormous computing power.** Unlike the cinema where pictures are generated once only, simulated images evolve as the user/observer manipulates them and moves around them. To plunge the user into a truly life-like virtual world, there are several

solutions, some of which can be combined. Novices can use conventional PC monitors for their first approach to virtual images. For a more real-life sensation wide screens and virtual immersion headsets with stereoscopic vision can be used.

Force feedback technology brings touch into play, enabling users to physically feel how a vehicle or vehicle part responds. Finally, driving simulators work from dynamic models to reproduce a vehicle's entire ride and handling behaviour on a dedicated platform.