

SIMULATING REALITY

to cut costs

Shivani Mody | TNN

Automakers used to develop a prototype of a car and then test it under extreme conditions before commercialising it. Then came IT solutions like computer aided design and computer aided manufacturing (CAD/CAM), where the car could be designed and tested to a great degree on the computer, before making a real prototype. That helped bring down design and development costs significantly.

But now, the process has begun to use virtual reality tools for everything from design to simulation to virtual analysis, and conditional testing to impact analysis.

Virtual reality (VR) is a computer simulation of the real-world environment that uses 3D graphics and external devices like a data-glove or helmet to allow users to interact with the simulation. Auto engineers move through a virtual reality environment, as they will in a real world, and play touch and feel with each part. Walking through structures and interacting with objects in the environment gives engineers a feel of the actual issues before implementing them.

Till now used mostly as an entertainment technology, VR has now moved into the commercial sector and is being used in varied

sectors like manufacturing, medicine, defence and science.

Cost saving

Mahindra & Mahindra uses 3D solutions for car manufacturing. The simulations help designers check wire mesh connections, air pressure and load among other things. At this level, actuals are tested against desired data and any flaws discovered are rectified. "From designing to testing to making the vehicle with minimum errors, the number of iterations can be reduced. This ultimately will reduce costs," says Ashok Asawale, head-IT for auto in M&M.

Foreign car manufacturers that have to localize their brands before launching in the Indian market use similar technologies. "For instance, cars here need to have greater ground clearance than is the case in other parts of the world," says Hilal Isar Khan, head-IT at Honda Siel Cars India.

VR tools can help automakers fix screws in a vehicle and check how they behave. They can simulate head-to-head collisions at varying speeds. The tyre durability, rolling resistance, thread wear, force and movement, noise and vibration are other things that can be tested. "Companies using VR tools have

Virtual reality came as an entertainment technology. Now it's finding use in varied commercial applications



reported about 30% to 35% reduction in cost, as also shorter time to market," says M M Prasad, head-India business (systems integration services), Tata Elxsi.

"An automaker spends around Rs 2 lakh to Rs 3 lakh on prototypes. All this additional cost can be reduced. Many European companies are increasingly getting simulation work done out of India," says S Shamasundar, MD of ProSIM, an engineering and R&D services firm.

In the defence sector, simulation can help army personnel to be trained to develop and assess new tactics, techniques or procedures and evaluate the efficiency of new weapon systems, all at lower costs. "Armed forces are faced with ever-changing needs," says Prasad.

A realistic virtual environment allows the forces to experience large-scale mission training and rehearsal, measuring and visualizing all risks before facing a real situation.

Building & surgical aid

In the design and development of plants, a lot of precision is required. Due to the size and complexity of a plant, it is not possible

for companies to create prototypes. Also certain measurements, flow of pressure, and temperature need to be studied carefully before implementation. "Using a flow simulation software, engineers can evaluate multiple configurations on the computer and choose the optimal design. This helps them remove all flaws much before starting the construction," says Rajagopalan Varadarajan, product manager in SolidWorks Simulation.

One of the features in the software allows designers to try out different materials for building products and check for their carbon emissions, "to design greener products," says Jeff Ray, CEO of SolidWorks.

Virtual reality is now touching the medical field and transforming the delivery of services. Doctors first practice operations using VR tools before carrying out the actual procedure.

Tata Elxsi describes an instance of neurosurgeon Dr Vini Khurana of Canberra Hospital operating on a person with an aneurysm in the brain using a software programme in a rapid CAT scanner to generate 3D images. The doctor rehearsed with the software, and throughout the operation he had a 3D image of the patient's brain projected onto one side of his eyepiece.



Doctors use simulations of planes to treat people who fear flying. The patient feels he is sitting on a plane, strapped in and ready for take-off. He is all set to scream, but on hearing the soothing voice of his therapist, combined with other coping strategies, doctors help him overcome the phobia.