



## Driving experience

All the movements and accelerations  
that you would experience in the real world

The EX Institute in South Korea allows car manufacturers and road safety authorities to research how different factors can impact the driving experience. This research can cover anything from how the chassis design affects the driving experience, to how different drivers react under different circumstances. To enable the most accurate research, the institute invested in a new driving simulator, and asked VHT to provide the motion system.

The priorities were accuracy and flexibility, as the institute wanted to be able to more accurately create the feeling of being in a real car on a real road. Previous systems had many limitations, particularly when it came to faster and more sustained accelerations, so VHT had to take a new approach.

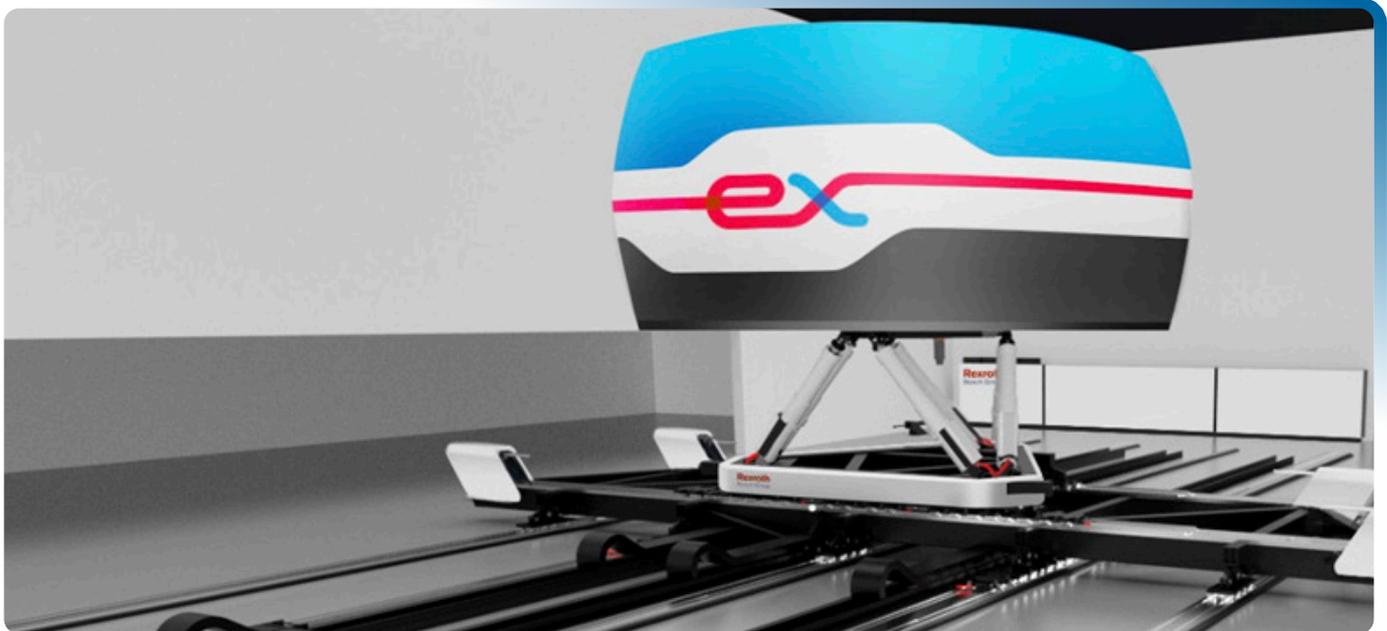
The customer also wanted the simulator to be able to handle payloads of up to 6,000 kg, to be able to

offer greater research capabilities across a wider range of mock-up vehicles. With this capacity, and the requested acceleration of 7 m/s<sup>2</sup>, it was a challenge that required the use of different technology.

However, the result would be a driving simulator that could provide all the movements and accelerations that you would experience in the real world, making the research and analysis more robust and valuable to the user.

### A new way to drive

In order to meet the requirements, VHT engineered and provided a combination of modern, innovative technology. The motion system consists of an XY table, with a hexapod and yaw drive system on top to give the best possible range of movement. These systems had been installed before, but only for smaller payloads. This system, along with the capability to move payloads of up to 6,000 kg, was unique at the time.



VHT changed the drive system. As they wanted accelerations of 7 m/s<sup>2</sup>, as well as a prolonged surge of movement, it took a different approach. Linear motors instead of rack and pinion drives, which can provide the acceleration and propulsion necessary. With regards to sustaining the feeling of acceleration, when the hexapod reaches its end stroke the XY table takes over and rotates very slowly, giving the sense of continued forward motion. So this system has a long stroke length, high acceleration, high velocities and a large payload. All the customer's requirements could be met. Upon using this technology and seeing how well it worked in this application, VHT was able to open up a whole new range of performance specifications.

### **Better simulation means better research**

The results have been excellent, with the simulator being able to recreate accurate acceleration, braking, cornering and the general feeling of being on a road. This is also helped by the fact that the dome can be larger, thanks to the increased payload capacity, so the mock-up inside can be more accurate. People can stay in the simulation longer because of the technology used, as the smoother and more subtle movements reduce the chances of motion sickness. This gives better, more robust data for users, which means the simulator is ideal for a variety of different research areas. Manufacturers can use it to help develop more comfortable, user-friendly vehicles, while road safety

authorities can use it to look at things like the impact of people using mobile phones while driving. It also helps that VHT is able to engineer its own linear motors, which can be built to the exact specifications and requirements of the simulator. For this specific application, that's a unique capability that has a number of benefits for the end user in terms of reliability and servicing.

### **Model for success**

VHT worked with the system integrator, Innosimulation, to deliver a simulator which was cutting edge at the time, and still at the forefront of simulation technology today. The system is in demand, and has helped users immensely in gaining a deeper understanding of driving experiences without actually having to be on the road. It has also helped manufacturers shorten their time-to-market, as iterations can be developed more quickly based on data from the simulation. All of this was made possible through a combination of innovation and effective collaboration.

The teamwork on this project was great.

It was a challenge as VHT needed to develop the new technology and ensure it met the requirements first time. To have been able to do this with a system that has very high acceleration, and high reliability, is something that made this special.