VHT VAN HALTEREN TECHNOLOGIES

Next generation flight simulation

VHT developed new and improved electric drive systems for larger flight simulation solutions

Flight simulators are essential when it comes to training and preparing pilots for the situations and gravitational forces that they will experience in a real plane. Aviation Academy Austria, or AAA, already owned older versions of VHT flight simulation systems. When AAA wanted even newer, more capable technology, the team asked VHT once again to provide the best possible solution.

AAA was looking for VHT to provide a completely new drive and control system for a modern, advanced flight simulator. Previous systems were mostly based on hydraulic technology, but as VHT developed new and improved electric drive systems it became viable to use it for larger flight simulation solutions. For flight simulation equipment to be truly viable, it needs to meet certain standards. For this particular simulator, AAA needed it to meet level D requirements. Level D is the highest standard of flight simulator, and is used to train civil pilots before they get into a real cockpit, so the force feedback and accelerations need to be as accurate as possible. To meet these standards while utilizing electric drive systems as opposed to hydraulic meant that VHT had to engineer a new and innovative solution – the eMotion-14000.

Load bearing

As the drive system has to move a heavy mock-up of a plane's cockpit, this version of the eMotion product line was designed to be able to handle loads of up to 14 tonnes. It was the first electrically driven VHT system capable of this payload, while the hexapod technology allows six degrees of freedom, increasing the range of movement available.

Developing a completely new system was challenging. VHT was developing this new electric system instead of the traditional hydraulic motion simulators. Through innovative engineering and excellent project management VHT was able to deliver this new system which meets the level D requirements as required. The technology consists of six actuators, each of which is driven individually to allow for the widest possible range of movement, and everything is powered only by electric motors. For payloads this heavy, this was a real achievement.

Compact competence

By switching to a fully electric system, the customer experiences a wide range of benefits. It's simpler technology, which means it's easier to operate and maintain, while the lack of hydraulics saves significant amounts of space. With hydraulic systems, it's often necessary to need a power unit in a separate room. These electric systems from VHT are compact, energy efficient and reliable, while also being able to provide the forces required for the simulation.

The main driver for the electric system was the simplicity. The system is bolted to the floor, the electric cabinet is fitted next to the motion system and then it's ready to work. The power usage is also lower for electric systems, especially with VHT systems which use static load compensation, saving even more energy. It's a simpler facility, easier to install, and cheaper. The initial costs and the total cost of ownership are both lower than hydraulic equivalents.

The system can generate the significant G-forces which are necessary for training, and it's all done through the electric drive and control systems moving the actuators beneath the cockpit. It's all about the accurate recreation of the entire flying experience, and therefore about putting the pilots through certain forces and accelerations while being as accurate as possible. VHT has managed to achieve all of this with the eMotion-14000.

The technology takes off

After the initial order, AAA asked VHT for another eMotion system for its business jet simulator, so they now have two eMotion-14000 systems installed. The customer is delighted with both systems, as they work as required and meet all of the parameters required for the level D certification. These systems are also built for optimal reliability, as they're running for 20-22 hours per day, and they've had no issues since installation.

Breakdowns cost money so VHT designed the system to ensure the best possible reliability. Everything about it was designed with the end user in mind, from its simple installation to the way it can be easily integrated with the software and the hardware from other suppliers, and it's technology that we will continue to optimize.