In full swing

Up, down, backwards, forwards, upside down, the right way up – with seven independently controllable swivel joints, a twelve-meter linear axis and a cabin that can rotate 360 degrees while being maneuvered in six different directions, the CyberMotion Simulator (CMS) in Tuebingen offers an almost infinite range of possibilities for motion simulation. Although you wouldn't be blamed for thinking it, the purpose of this worldwide unique instrument is not to serve the development of the latest attraction at the Oktoberfest in Munich. Instead, the research team led by Heinrich Bülthoff at the Max Planck Institute for Biological Cybernetics is using it to investigate the complex interactions between vision and balance in the human brain.

Constructed on the basis of an industrial robot arm, the CMS can move test subjects in almost every position imaginable. The person in the cabin can be guided passively along predefined tracks or control the motion themselves using a steering wheel or joystick. Even real helicopter flights can be simulated. The large, high-resolution display on the interior wall of the cabin provides the appropriate virtual reality scenario.

The scientists are particularly interested in the possibility of individually stimulating each of the sensory organs responsible for spatial orientation. In this way, they can for example investigate what causes the dizziness that not seldom occurs when people are moving in virtual spaces, for example when playing computer games that require VR glasses. This is also highly significant for the development of autonomous vehicles. By the time that passengers have developed enough trust in the self-driving car to occupy themselves with completely different activities during the journey, their physical self-awareness will not coincide with the information delivered by the eyes to the cerebral cortex in the brain. And quite a few people react to this with nausea.

Photo: Berthold Steinhilber/MPI for Biological Cybernetics