



How do you get virtual reality to fly?

In Airbus aircraft, space concepts for airlines with a wide range of different business models — from economy to luxury class — can be realized. In Hamburg, an in-house Virtual Reality Department provides support in cabin design for the various departments. For ergonomics, the company uses RAMSIS in VR. Melf-Heiko Mast, Airbus engineer, is a true force among RAMSIS users in the VR segment.



As real as possible

Although virtual reality (VR) is relatively new for other industries, Airbus has been working consistently with it for some time now, incorporating the technology into its own processes. And RAMSIS itself has been part of the VR landscape since 2004. In a pilot project carried out with Human Solutions, RAMSIS was integrated into VR (here: DeltaGen by RTT). A comprehensive technology landscape has meanwhile been created, one which links the VR platform with motion tracking and ergonomics. The acceptance level is high, not least because you can evaluate everything just as in real life ... and sometimes even better. The lifelike imaging and technical enhancements, such as ergonomic functionality bring additional value and contribute to the success of Airbus with VR. Ergonomic checks are usually carried out on comfort, vision and operability. A total of 12 standard RAMSIS manikins and other special manikins are in the Airbus VR department, representing passengers, cabin crew and workers in assembly and maintenance.

First make your changes virtually, then discuss constructively

VR is now an integral part of development and design at Airbus in Hamburg. Virtual simulation brings the departments of engineering, design, final assembly and maintenance together to one table during the concept phase. A coordination process then begins — one which lasts for months or even years and only ends when the aircraft is complete. Problems are discussed and resolved quickly and effectively on the virtual mock-up. The simulation shows the later airplane in interaction with passengers and cabin crew — changes and their effects can be reconstructed and evaluated immediately. This is important, because often a small item like an adjustment in design can affect installation, maintenance and ergonomics. Thanks to the integration of RAMSIS, Airbus can check the reachability of oxygen masks, for example, the visibility of messages and the free movement of passengers and cabin crew in the virtual reality environment. A change to CAD is not necessary.

VR in real time — cabin operations

The handling of the cabin trolleys is checked in the VR Lab, for example. The only real entities here are the trolley with original items and the test person who operates the trolley instead of a crew member. The test person is transferred to VR as a RAMSIS manikin. The passengers are ready for virtual action in the form of RAMSIS manikins, as is the virtual cabin. Real and virtual data are merged with the VR environment. Live and in color, the Airbus experts can look at the so-called power wall as the trolley is pushed into the kitchen block or down the aisle by the test person or manikin. Since the action is actually carried out and transferred to the VR program, the virtually simulated flight attendant adopts a completely realistic posture when he pushes the heavy 220-pound trolley. Possible collisions with the manikin passengers or seats would be seen immediately.

Movement in the mock-up

This form of virtual reality in combination with real-time motion not only saves a lot of coordination time — but what we had to show earlier in CAD as the result of many individual images is now a real flow of movement thanks to motion tracking. And with the help of RAMSIS, the movement is based on a body with real dimensions, proportions, relevant posture and agility.

Airlines and the design process

Each airplane cabin is built to customer specifications. That's why Marketing & Sales also use VR. A model which doesn't even exist yet is presented virtually. Airline requirements for cabin design (other than the standard configurations) are checked ergonomically in VR where necessary. This ensures that the available space complies with the authorities' regulations. And this is especially true of security concepts. In the event of an evacuation, for example, a crew member stands at an emergency exit to supervise passengers leaving the aircraft. For economic reasons, this area should be as small as possible, but for safety reasons it must be large enough to enable staff to stand there and help the passengers exit the airplane.

And what will the future bring?

Melf-Heiko Mast has plans. He wants to expand the integration of movement, for example, and he also has a few suggestions for further RAMSIS analyses that he would like to implement directly into VR — together with Human Solutions and RTT. Virtual Reality at Airbus remains fascinating.

What RAMSIS can do in VR

- Image of the real test person, his body geometry, movement and field of view in the model and synchronization with the environment
 - Maximum interaction with the digital mock-up
 - Analyses for visibility, reachability and space requirements, such as a comparison of the fields of view of persons of different heights
 - Application: Ergonomic interior design, feasibility of installation and maintenance activities
 - Standard integration in DeltaGen by RTT
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