xReality

New development and training methods as well as global collaboration

IAV uses virtual and augmented reality („xReality") not just as part of the industrial development process but also for cross-cutting topics such as global collaboration, modern training methods and the future workplace. VR meetings transcending geographic borders offer advantages, for example when working on 3D vehicle models. Reliable end-to-end links permit cross-site processing of the models. Change processes are documented through comments in the VR meetings as well as with videos and photos. The participants are visualized as avatars and can talk to each other, with a live view of the details that the others are looking at and which changes are requested. The current data record is automatically visualized and perceptible.
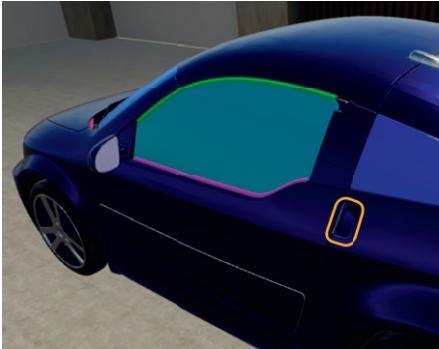
Modern training methods in virtual space also permit immersive, interactive VR learning. Where compliance training is concerned, for example, we offer virtual trips to China. The protected space makes the training situation comprehensible for participants and companies. Active learning by the participants with autonomous action and reflection enhances their ability to remember what they have learnt. In future it may be possible to become immersed in the corporate world from pleasant surroundings, such as a garden or beach, with the possibility of staying in contact with colleagues and accessing necessary information. When the work is finished, we simply emerge in our real world again. xR technologies can help to make this kind of workplace a future reality.

Our experts use the advantages of xR throughout the entire product development process (PDP). Possible applications extend from presenting and accepting various concepts through to conducting assembly and disassembly tests. We also use xR for simulation, on the assembly line, and for service and maintenance in aftersales.

In the early development phase, the use of xR permits more detailed concept and design decisions as it is possible to experience the product model interactively. This helps to reduce the number of expensive prototypes.

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xR Use Cases

Visualizing a concept vehicle including highlighted interaction possibility

VR and AR for visualizing concept vehicles

Our developers visualize the vehicles already in the early concept and design phases in order to assist the product development process (PDP). For example, AR can put the vehicle on the desk with the possibility of transforming and scaling the object, using various animation and audio functions. In addition to this simple, portable AR solution, global VR collaboration permits synchronized perception and processing of the vehicle models at various sites. A vehicle interior model in 1:1 scale lets us sit in the vehicle and perform tests in the surroundings and vehicle interior. VR also offers numerous other interaction possibilities.
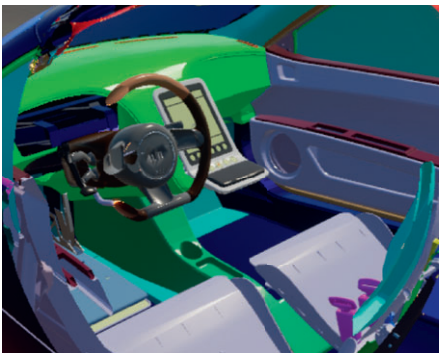
Spherical cutting function in VR

Innovative VR interaction possibilities

Generally speaking, we offer two approaches for VR interaction with various models. Firstly, we use a wide range of controller functions. The left controller selects the function, while the right controller offers sub-functions, such as measuring, teleporting, drawing, creating mannequins, picking up, cutting (free form, in a certain axis, spherically) and more. The second approach is based on leap motion with stylized depiction of the user's hands for user guidance and gesture control without controllers. This permits simple actions such as pulling and pushing. The user can also grasp and use various tools such as screwdrivers, measuring tools or crayons.

Localizing the components in the engine compartment

Augmented reality in aftersales

IAV uses tablets, smartphones and also smart glasses, such as HoloLens, to implement AR apps. As far as smart glasses are concerned, we expect to see rapid development of the hardware in terms of comfort, field of vision and depiction quality. AR makes aftersales more efficient with a view to the growing vehicle complexity, where it offers considerable added value. The technology also makes sense for workshops and final customers in various applications, including service and maintenance, coaching and training as well as fault and damage documentation. It also makes sense to link up with vehicle diagnostics for troubleshooting and with the parts catalogue for the purpose of ordering spare parts for service requirements.

CAD tracking for maintenance support

Part tracking based on design data

CAD tracking lets us recognize parts in reality based on the original design data. The advantage here is that no marker has to be applied to the real-life objects, nor is there any need to create virtual reference objects. While designing the vehicle and generating manual contents, in future this technology can also be used to create service and maintenance applications directly in the development process, so that we can support workshops and final users during service and maintenance with interactive user manuals and AR repair guidelines including animation features, warnings and explanations.