

PRESS RELEASE

The use of VR for training employees in the automotive sector

Rostock-based Fraunhofer IGD presents Machine@Hand 2.0, a flexible and powerful virtual training environment. Virtual reality (VR) allows complex assembly processes and the machining of new component variants in the automotive industry to be communicated in a clear and readily comprehensible way. Used for the upskilling of employees, VR training scenarios are adding special value in the changeover to electromobility. On display at LEARNTEC and HANNOVER MESSE.

The immense economic potential of virtual reality for employee training has been the subject of lively discussion for many years, and it continues to gain traction with the advance of alternative drive technology. New engine designs, control systems, wiring configurations and much more besides bring with them a multitude of new procedural sequences on the assembly line as well as in service and maintenance. The increasing use of supporting robotics in production also requires more training for personnel, who are required to work in close proximity with these semi-autonomous machines.

Machine@Hand 2.0 is the second version of the VR training environment developed by Fraunhofer IGD at its research facility in Rostock. It simulates the complexity of production lines in terms of equipment, material supply, tools and spatial production environment. This means that every work step can be tested and rehearsed in virtual reality. The experience gained from virtual validation helps to optimize workplaces and work steps for new models and component variants and makes a major contribution to occupational safety where sequences of operations are potentially hazardous. This results in every move being perfected, even before the first real production vehicle rolls off the assembly line.

Easily create your own VR training

Many companies have already integrated VR into their business and manufacturing processes, and it has become a standard component of

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**Machine@Hand by
Fraunhofer IGD
on display at**

LEARNTEC
Karlsruhe, Germany
May 31 – June 2, 22
Hall 2, Booth J40

HANNOVER MESSE
May 30 – June 2, 22
Joint Fraunhofer
Stand
Hall 5, Booth A06

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complex planning procedures. Since Audi pioneered virtual assembly planning for new vehicle models, VR has established itself as a cost-saving digital process in the automotive industry. However, the creation of training content – which must be precisely adapted to the new vehicle part, the new sequence of actions in production and/or the maintenance scenario – continues to pose a challenge.

Machine@Hand comes with a user-friendly authoring tool. Instructors can load vehicle parts and their components directly into the system as 3D or CAD models without the need for any work-arounds and use them as templates for the VR training elements. This enables instructors to set up individually tailored training courses without prior programming knowledge, and to supplement or adapt training content with text or information. A wide range of elements from a variety of libraries can be combined to create complex learning scenarios. This facilitates straightforward integration into existing e-learning production workflows and complements existing authoring tools with an effective VR component.

Mario Aehnelt, Head of Visual Assistance Technologies at Fraunhofer IGD in Rostock: “With Machine@Hand 2.0, we have developed a virtualization platform that outperforms systems developed in-house, primarily because of the integrated VR authoring tool, and which can still be readily integrated into complex technical infrastructures. Fraunhofer IGD has been a dependable partner to the automotive industry for many years now. We develop quality solutions and set new standards in digitization. In addition, we support our partners with comprehensive scientific consulting and a variety of complementary service offerings.”

The next development stages: Ergonomics and collaboration

The team led by Mario Aehnelt is currently working on two further USPs of Machine@Hand 2.0. Whenever collaborative working is involved, other software solutions reach their limits. Fraunhofer IGD is therefore working on the possibility of joint training, so that team processes can also be trained virtually. This saves travel time and ensures that courses go ahead even if group instruction and practice sessions are not possible, as has frequently been the case during the corona pandemic.

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It has already proved possible to not only to provide staff training in complex work processes with the VR system, but also to check the psychological stresses they induce in humans. A variety of stress-relevant measured values (respiration, pulse, skin conductance, etc.) can be recorded via a smartwatch during the VR application and fed directly into the system. The evaluation is automated through the use of machine learning. There are also plans to measure physical stress in order to optimize processes ergonomically and to train staff in healthy ways of working.

Visual computing research as a basis for new technologies

Fraunhofer IGD is a trusted industry partner and has been setting standards in visual computing for over 30 years. This is achieved through a unique breadth of competencies and technologies which are custom bundled for partner companies.

Cross-functional teams of experts well versed in the sector can also take on the management of projects of all sizes. This makes the consortium of Fraunhofer IGD, Fraunhofer Austria and Fraunhofer Singapore the first point of contact in visual computing for fast-track technological projects as well as ongoing transformational projects. Success is assured in the long term by access to an international network of youthful talent and established professionals.

If you are interested in Machine@Hand 2.0 and would like to receive further information, please contact machineathand@igd-r.fraunhofer.de. We offer the opportunity to try out a demo version of the authoring tool free of charge.

For more information:

Further information on this exhibit of the Fraunhofer IGD at the LEARNTEC: <https://fh-igd.de/learntec-en>

Further information on this and all other exhibits of the Fraunhofer IGD at the HANNOVER MESSE: <https://fh-igd.de/HMI-en>

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Photo (M): The 3D/VR authoring tool Machine@Hand allows to instruct and train new users in complex, difficult and dangerous technical tasks on a virtual twin in a secure VR environment.
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About Fraunhofer IGD

Founded in 1987, the Fraunhofer Institute for Computer Graphics Research IGD is the world's leading institute for applied research in visual computing—computer science based on images and 3D models. We turn information into images and images into information. Keywords are

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human-machine interaction, virtual and augmented reality, artificial intelligence, interactive simulation, modeling, 3D printing and 3D scanning. Around 180 researchers at three locations in Darmstadt, Rostock and Kiel in Germany develop new technology solutions and prototypes for industry 4.0, digital healthcare and the smart city. With an annual research volume of €21 million, we use applied research to help in the strategic development of industry and the economy.

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