

Title: Sound Simulation and Visualization in virtual Manufacturing Systems

Aim of the project:

- Development of simulation models for invisible information in factories
- Visualization of simulation results using VR
- Improved VR-supported CIP (Continuous Improvement Process) workshop

Innovation and results:

In this project, a novel concept to investigate the noise level is proposed. The phonon tracing algorithms is implemented for the noise simulation. The integration of simulation results in Virtual Reality (VR) enables an investigation of the effect of different materials on the spectral energy/pressure distribution. Different VR platforms such as Power Wall and Cave Automatic Virtual Environment (CAVE) are implemented. Furthermore, a representation of simulation results in the virtual environment is visualized in a CAVE.

Summary/Outlook:

The analysis and evaluation of potential reconfigurations are realized by VR-supported CIP workshops. In the future, a lighting simulation and energy flow would be visualized in the virtual environment as well. To achieve an enhanced degree of immersion in the CAVE, additional senses of human perception such as hearing (acoustic) and feeling (vibration), will be addressed.

Selected Publications:

X. Yang, E. Deines, C. Lauer, J.C. Aurich: Virtual Reality Enhanced Human Factor – An Investigation in Virtual Factory. In: Proceedings of Joint Virtual Reality Conference of EGVE – ICAT – EuroVR (JVRC), 2010, Stuttgart, Germany.

X. Yang, S. Schröder, M. Hering-Bertram, T. Biedert, H. Hagen, J.C. Aurich: Noise Investigation in Manufacturing. In: Proceedings of 44th CIRP International Conference on Manufacturing Systems (ICMS), 2011, Madison, USA.