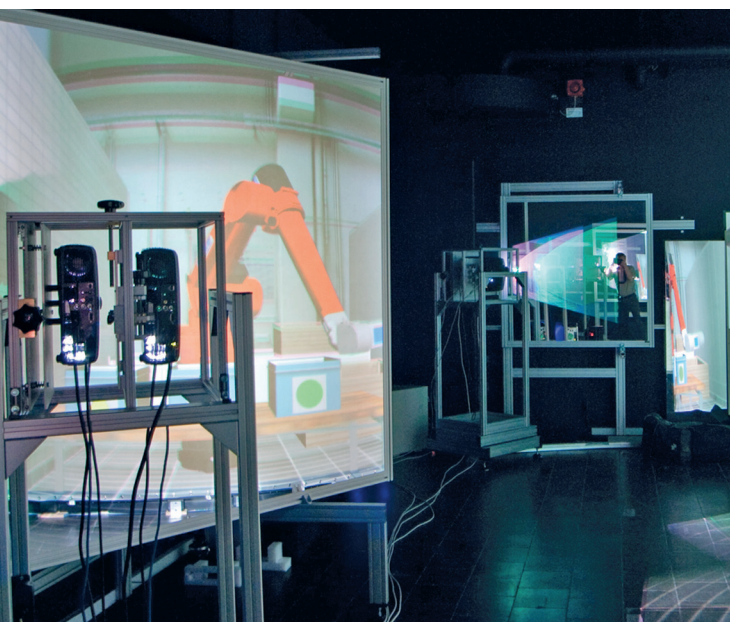


Mittelstraße 51  
10117 Berlin  
Germany  
Phone: +49 30 288763800  
Fax: +49 30 288763808  
E-Mail: [info@dguv.de](mailto:info@dguv.de)  
Internet: [www.dguv.de](http://www.dguv.de)

— August 2014 —

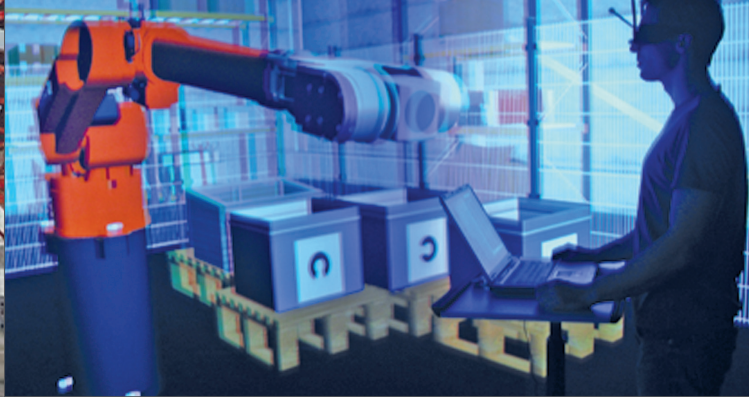
In the IFA's VR interaction room, work processes are projected dynamically and in 3D onto a wall with a width of 8 m and a height of 3 m. The projection area encompasses a segment of 164° with a radius of 2.80 m. The effect is virtual extension of the 7 m<sup>2</sup> interaction area. In order for human beings to be fully immersed in the virtual environment, VR exploits, continually and in real time, the way they process information received by the senses of sight, hearing and touch. Further human senses can be addressed by the surround sound system and the integration of real displays and controls into the VR environment. For example, the human operator can access different areas of a plant or a construction site and interact with equipment, tools and machinery like in reality.



## SUTAVE

Safety and Usability through Applications in  
Virtual Environments

Virtual reality in  
occupational safety and health  
An IFA service



## Why use VR in occupational safety and health?

The Institute for Occupational Safety and Health of the German Social Accident Insurance (IFA) uses virtual reality (VR) for problem solving in work systems design and for innovative design in the area of occupational safety and health (OSH). Workplaces are supposed to be designed in a way to be safe and usable. Safety and Usability through Applications in Virtual Environments (SUTAVE) describes the objectives in research and consultancy activities to facilitate successful prevention.

## How does VR work?

VR simulates real workplaces for occupational safety and health purposes. Information and projection technology are used to produce a virtual, three-dimensional, dynamic work environment. Within work scenarios for example some parts of a machine move of their own accord while others can be moved by human operators. Perspective, angle of view, and acoustic and haptic properties change according to where the person is standing and how he or she moves relative to the environment. VR technology allows human information processing close to real life situations. VR thus promotes natural behaviour of humans interacting with the virtual work environment.

## Benefits of VR for OSH

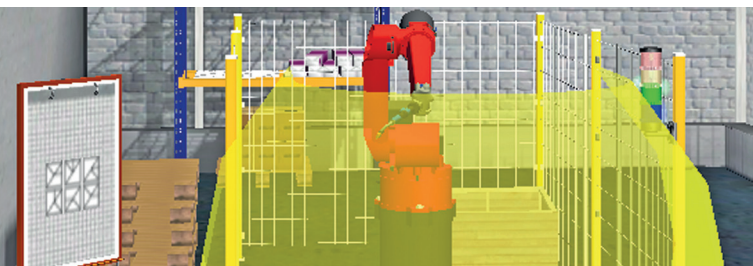
VR enables all phases of a product life cycle, from design, through use, up to disposal, to be simulated, analysed and optimized. VR can be used for OSH purposes to:

- Review and improve the usability of products and processes whilst their development and design are still in progress. This enables errors in development and the need for subsequent modifications to be avoided.
- Systematically and empirically review design solutions for the human-system interfaces and their influence upon human behaviour. This reduces the need for physical modifications to machinery, and for extensive field studies.
- Safely test potentially hazardous products, processes and safety concepts. This avoids actual hazards during the study of human-system interaction.
- Identify cause-effect relationships following accidents on and involving products. This saves material, personnel, time and financial outlay associated with in-situ testing.

## Why does the IFA use VR?

The IFA makes use of VR for OSH purposes by combining four core competencies in a unique way:

- **Practical relevance**  
Knowledge of industrial practice, experience of occupational safety and health, and close contact with the social accident insurance institutions and their member companies.
- **Expertise**  
An interdisciplinary team comprising IT experts, engineers and psychologists, with many years' experience.
- **Technology**  
Equipment and control room, and an interaction room with projection wall, cutting-edge visualization technology, and full immersion effect.
- **From a single source**  
The service encompasses definition of the study's scope, study design, scenario development, recruitment of participants, interpretation of the results, and reporting, which are monitored by the commissioning party. Technical implementation and introduction in the field are also agreed in close consultation with the commissioning party.



### Further information:

Dr. Peter Nickel  
Andy Lungfiel  
[www.dguv.de/ifa/sutave](http://www.dguv.de/ifa/sutave)

Institut für Arbeitsschutz der  
Deutschen Gesetzlichen Unfallversicherung (IFA)  
Alte Heerstraße 111  
53757 Sankt Augustin  
Germany  
Phone: +49 2241 231-02/ Fax: +49 2241 231-2234  
E-Mail: [ifa@dguv.de](mailto:ifa@dguv.de)