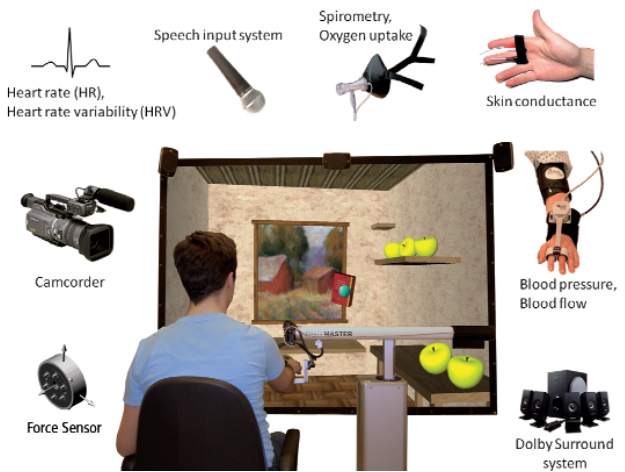


Setup for the lower extremity rehabilitation consists of a Lokomat® system extended by an immersive multimodal environment and measurements of physiological data.



Setup for the upper extremity rehabilitation consists of a HapticMaster® system extended by an immersive multimodal environment and measurements of physiological data.

## Consortium & Partners

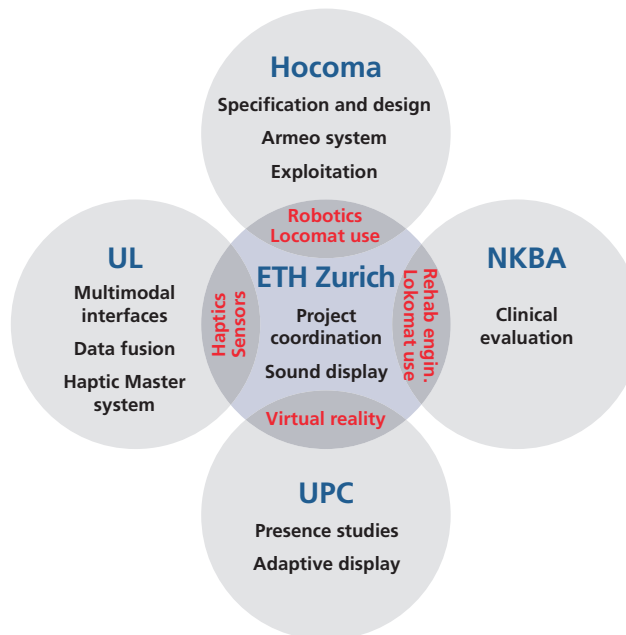
Swiss Federal Institute of Technology, Zurich (ETH Zurich)  
and Spinal Cord Injury Center,  
University Hospital Balgrist, Switzerland  
Prof. Dr.-Ing. Robert Riener

Hocoma AG, Switzerland (Hocoma)  
Dr. Lars Lünenburger

University of Ljubljana, Slovenia (UL)  
Prof. Dr. Marko Munih

Technical University of Catalonia, Spain (UPC)  
Prof. Dr. Mel Slater

Neurological Clinic Bad Aibling, Germany (NKBA)  
Dr. med. Friedemann Müller



## Multimodal Immersive Motion Rehabilitation with Interactive Cognitive Systems



## Project

MIMICS will enhance a robot-assisted motion rehabilitation system with adaptive feedback based on physiological and cognitive data (motion, forces, voice, muscle activity, heart rate, skin conductance etc.). These data will be acquired in real-time, and the state of the patient and the overall psycho-physiological condition will be inferred from them.

In order to make rehabilitation training more realistic and motivating, this information in combination with immersive virtual reality (VR) systems including 3D graphics and 3D sound will be used to drive the rehabilitation robots.

Technical progress is likely in, for instance, real-time sensing, fusion of multi-sensory real-time data streams, and multi-modal immersive VR interaction. Much effort will be devoted to evaluation with patients to assess the effects of using the system.

It is expected that MIMICS technology will enter clinical routine so that large patient populations (e.g. stroke, spinal cord injury patients) can benefit.

## Scientific Objective

Improve sensory-motor rehabilitation through enhanced motivation and engagement generated by immersive multimodal virtual environments.

## Technological Objective

Apply multi-sensory data analysis of online sensory-motor actions and physiological measures, and multimodal display methods in order to control presence, attention and motivation within immersive virtual environments.



For all contents of this brochure the consortium is solely responsible for. They do not necessarily represent the opinion of the European Community.

## Work Packages

- WP 1** System specification and hardware setup
- WP 2** Multimodal immersive interactive display environment
- WP 3** Multi-sensory data processing and decision making
- WP 4** Experimental evaluation
- WP 5** Dissemination and exploitation
- WP 6** Project management

## Financial Support

**Programme:** European Community's Seventh Framework Programme (FP7)

**Funding Scheme:** FP7-ICT-2007-1, Objective 1.2.1: Cognitive Systems, Interaction, Robotics

**Grant agreement number:** 215756

**Project start:** January 1, 2008

**Duration:** 36 months

**Total cost:** 2.228.100 EUR

**Commission funding:** 1.600.000 EUR