

# Construction of a Portable Virtual Reality System

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## Overview

ReWaVE is a virtual reality simulator that allows the user to move in a virtual environment by real walking in the real world. The virtual environment is shown on a head-mounted display and the user's head position is tracked. Any movement in the real world is then translated to a movement in the virtual world the user sees.

In order to get rid of cumbersome cables running from a stationary computer to the user, the user carries a laptop in a backpack-like construction. This laptop renders the virtual environment and powers the head-mounted display as well as the tracking system.

By now the laptop and the backpack are not up to the current state of technology anymore and some of the hardware components have been replaced. Therefore, the system should be redesigned based on the experiences with the first version and should improve ease of use.

This redesign also offers the opportunity to re-evaluate the overall setup with respect to recent hardware developments, in particular new available mobile devices and wireless display technologies.

In order to evaluate this new components the overall system latency has to be determined for the current setup and be compared to measured or estimated values of the new components to determine their usability.

This work will include the construction of new backpack considering ergonomic and technical criteria, such as ease of use, attachment of the laptop, possibility of attaching additional sensors or hardware to the backpack and user comfort. This thesis might also include design and construction of an additional power supply for the head-mounted display.

## Tasks

- Requirement analysis for the updated system
- Evaluation of new available hardware
- Evaluation of optimal placement and attachment of hardware
- Construction of the new backpack

## Skills

- Interest in virtual reality
- Interest in working with hardware and construction of the system

## Results

The results of this thesis have to be summarized in a written report and will be presented to the ICVR group in a 20 min talk.



The current ReWaVE system

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