

# Spatial Mouse

Combination of a VR Controller and a Computer Mouse

Final Presentation

Physical Computing

# Who we are

## Robin Erb

- 6. Semester
- Computer Science (B. Sc.)
- Hiwi at HCI

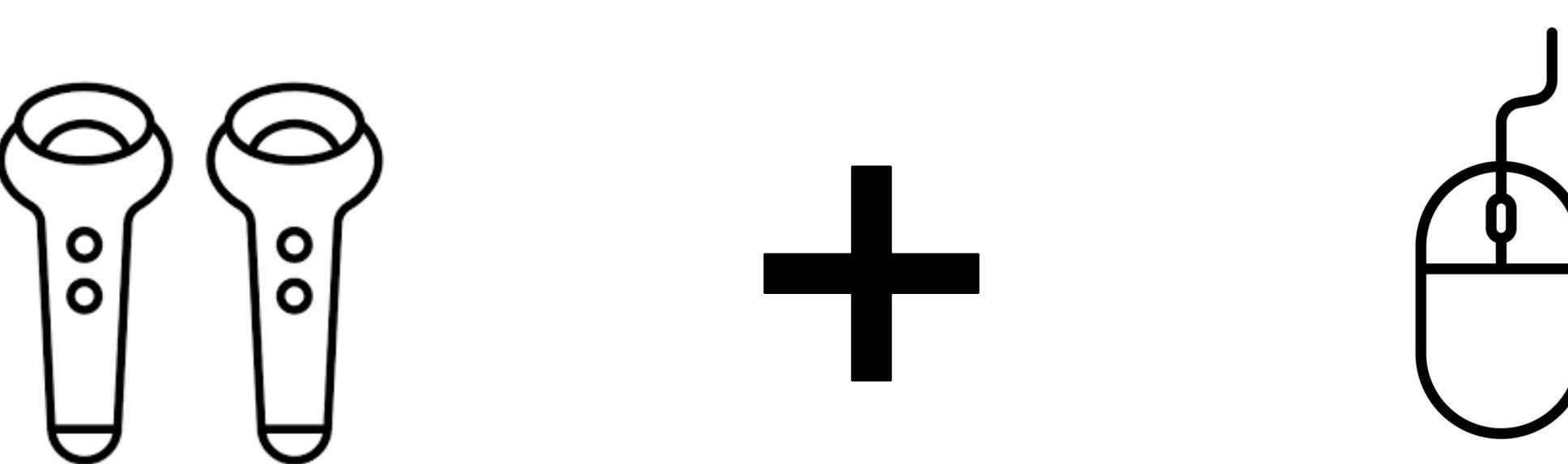


## Cedric Wiese

- 7. Semester
- Computer Science (B. Sc.)
- Hiwi at HCI

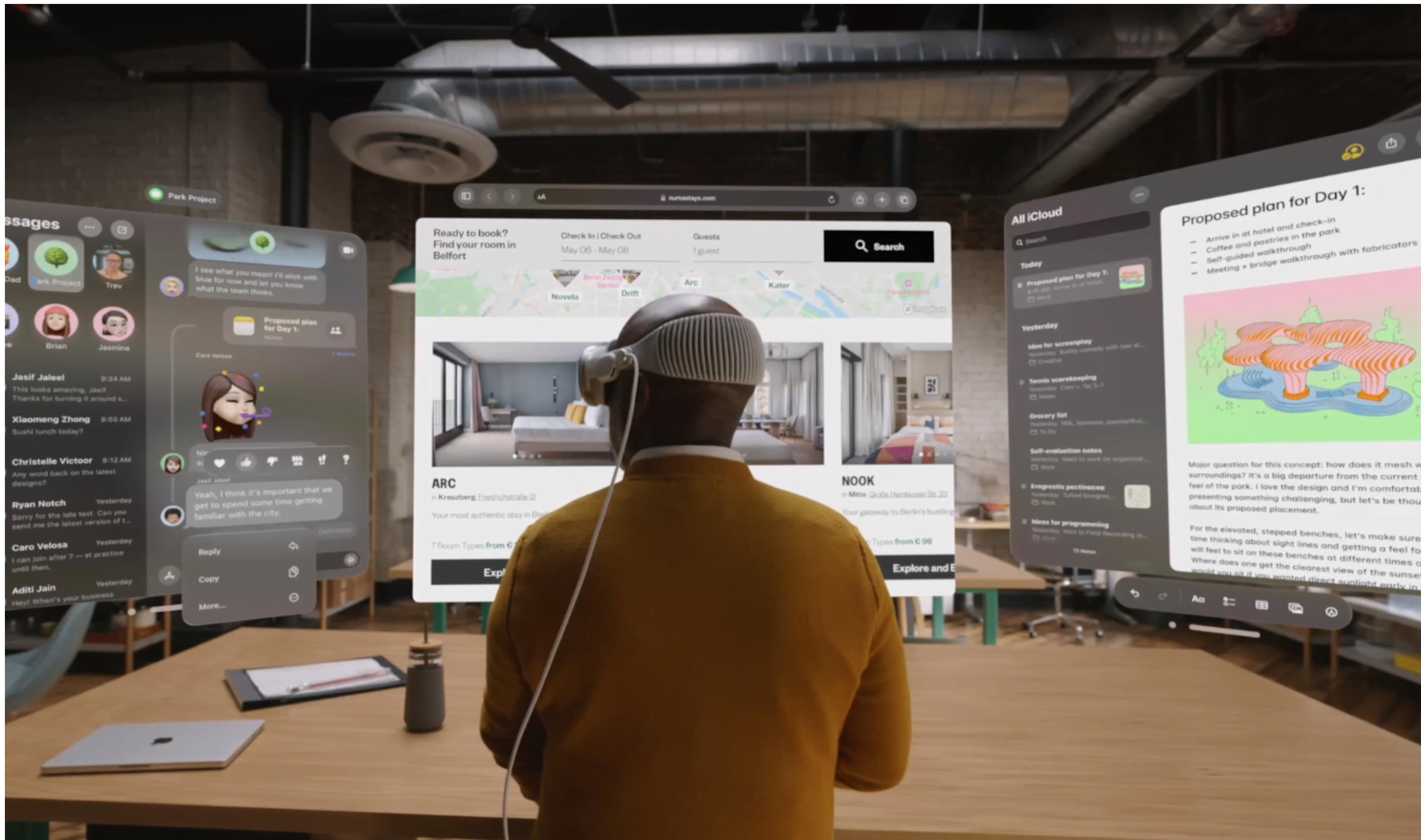
# Introduction

## What is the Spatial Mouse?



# Introduction

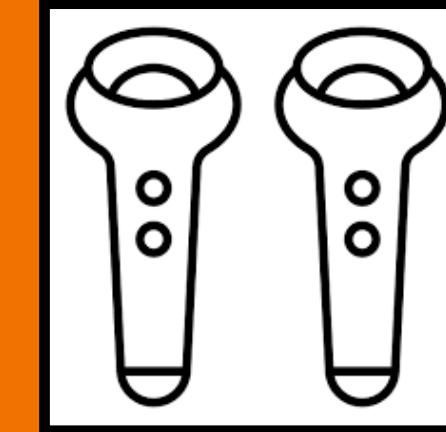
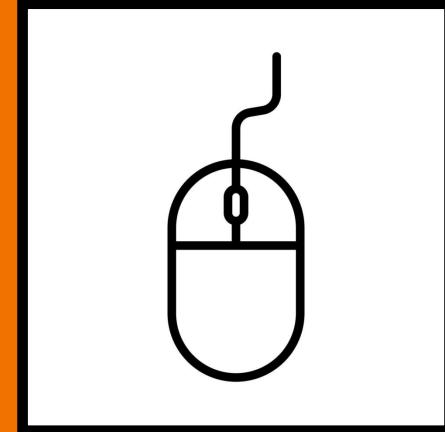
## What is the Spatial Mouse?



# Requirements

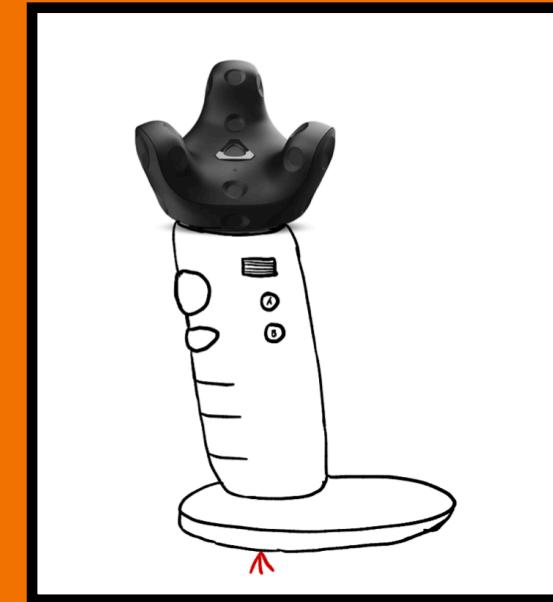
R1:

Spatial Mouse should have a dual-mode functionality



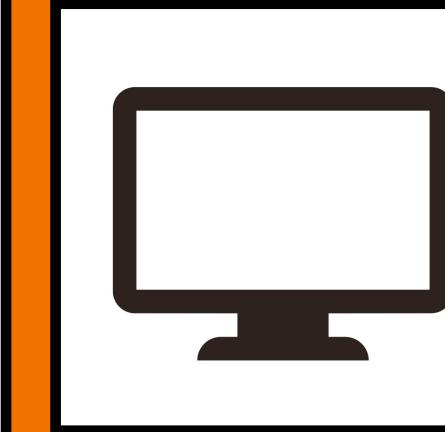
R2:

Spatial Mouse should have an ergonomic design



R3:

Spatial Mouse should support context-aware interactions



# Project Idea

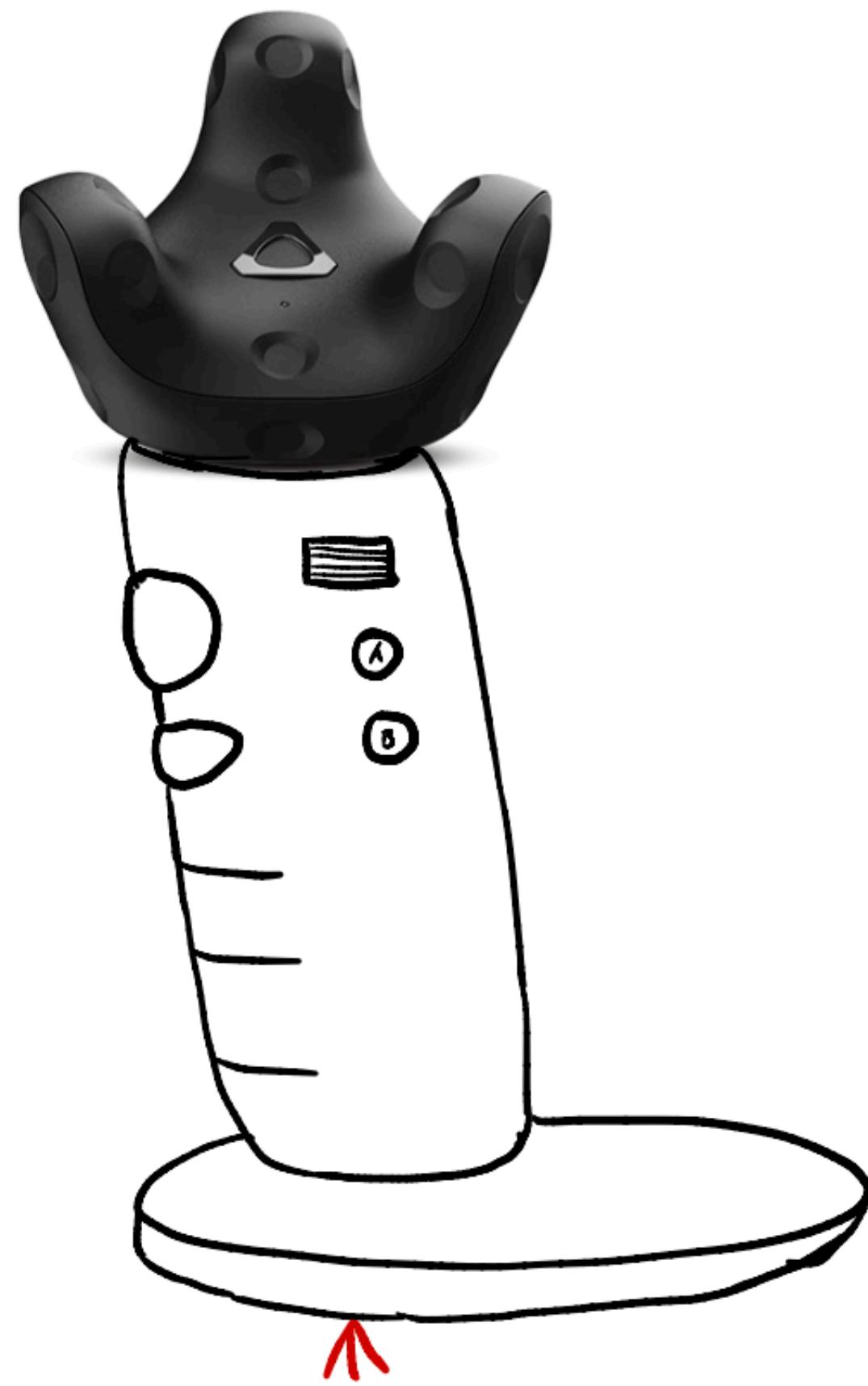
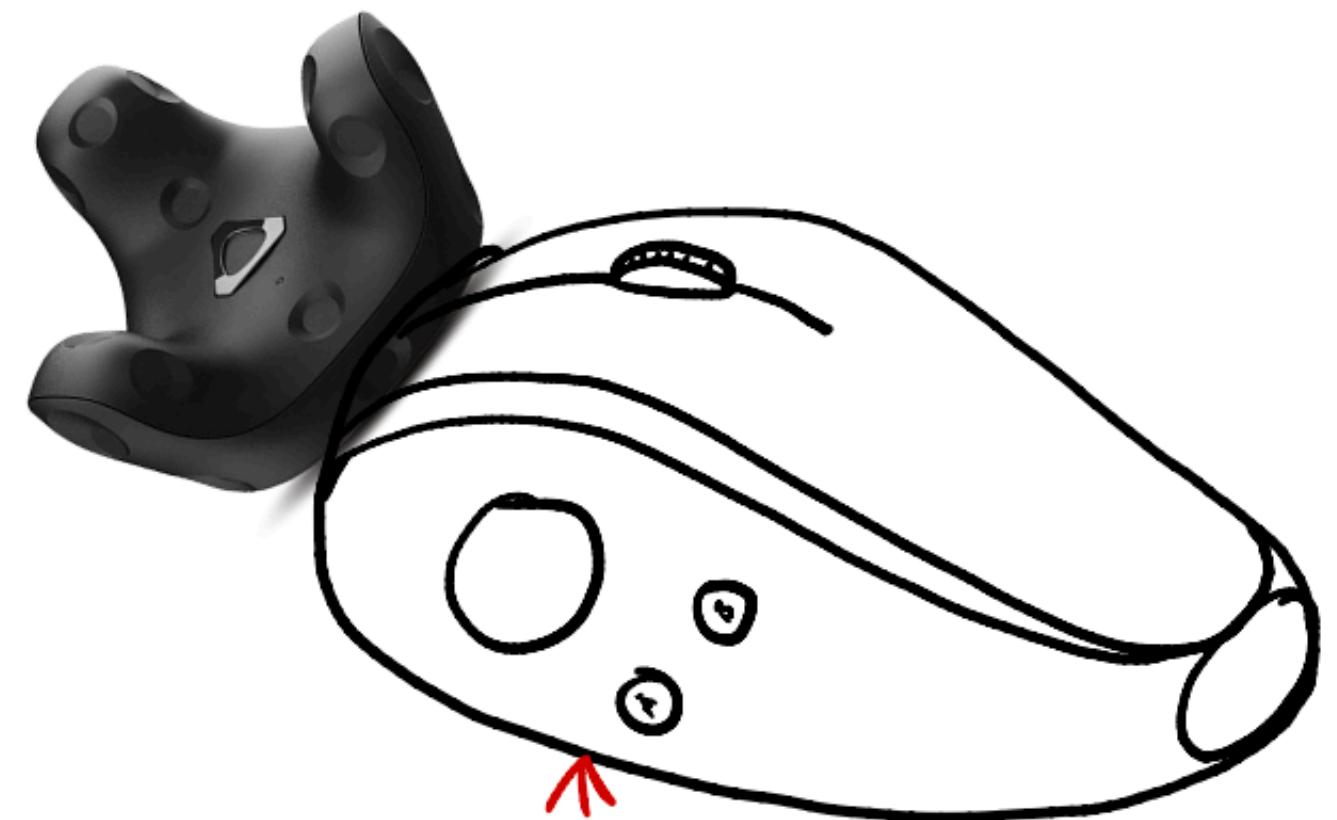
# 1. Design

## VR Controller + Mouse



## 2. Design

### Own Design



## 2. Design

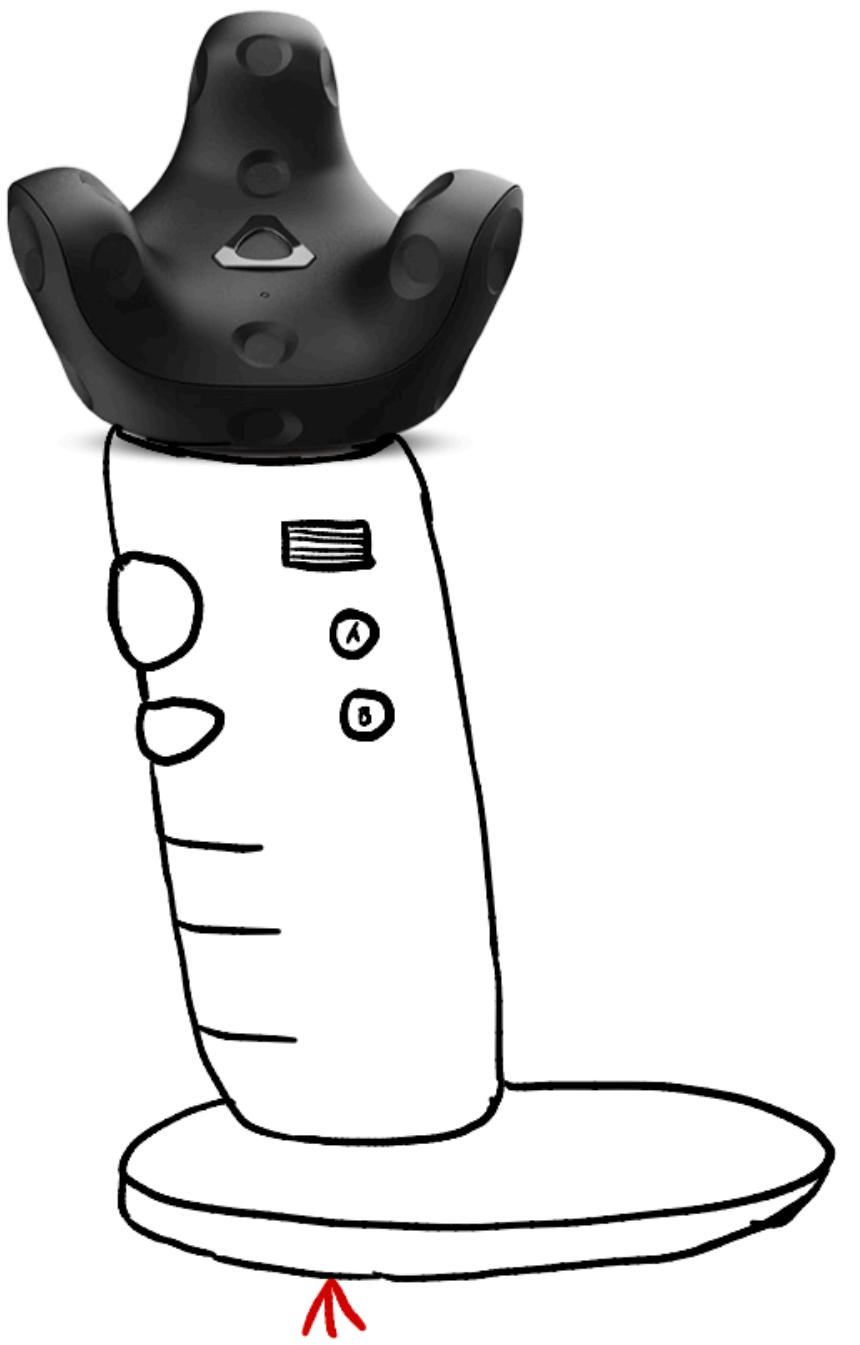
### Own Design



+

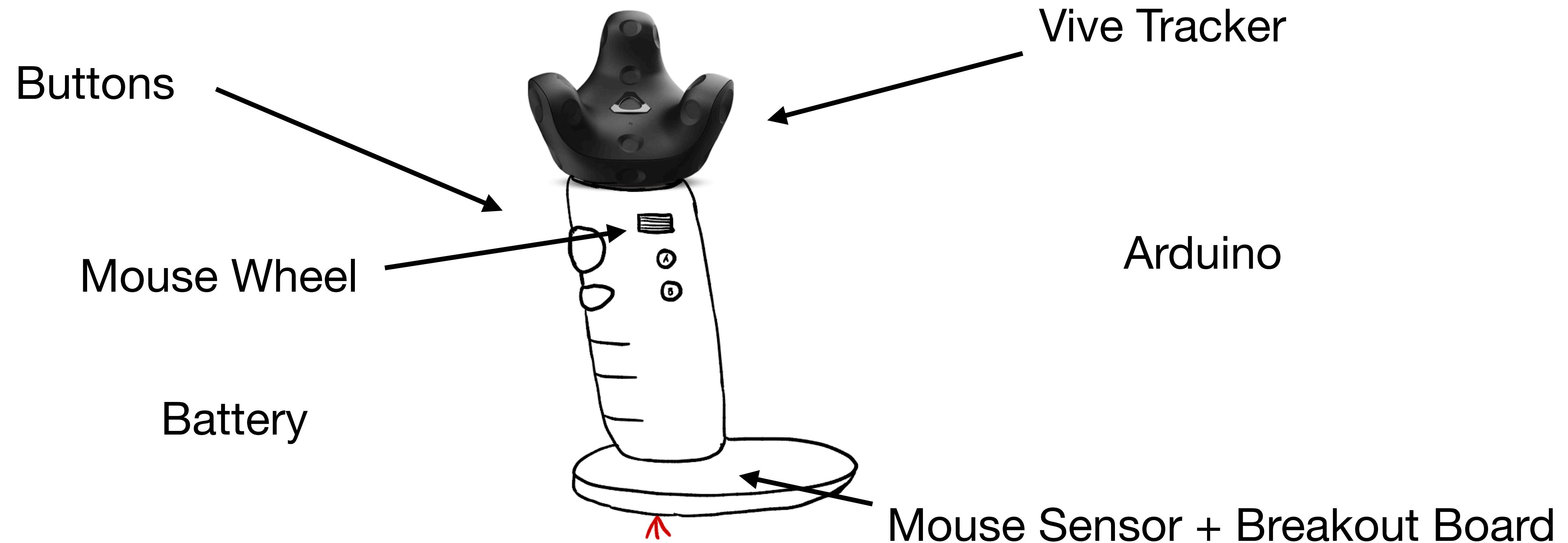


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# Components

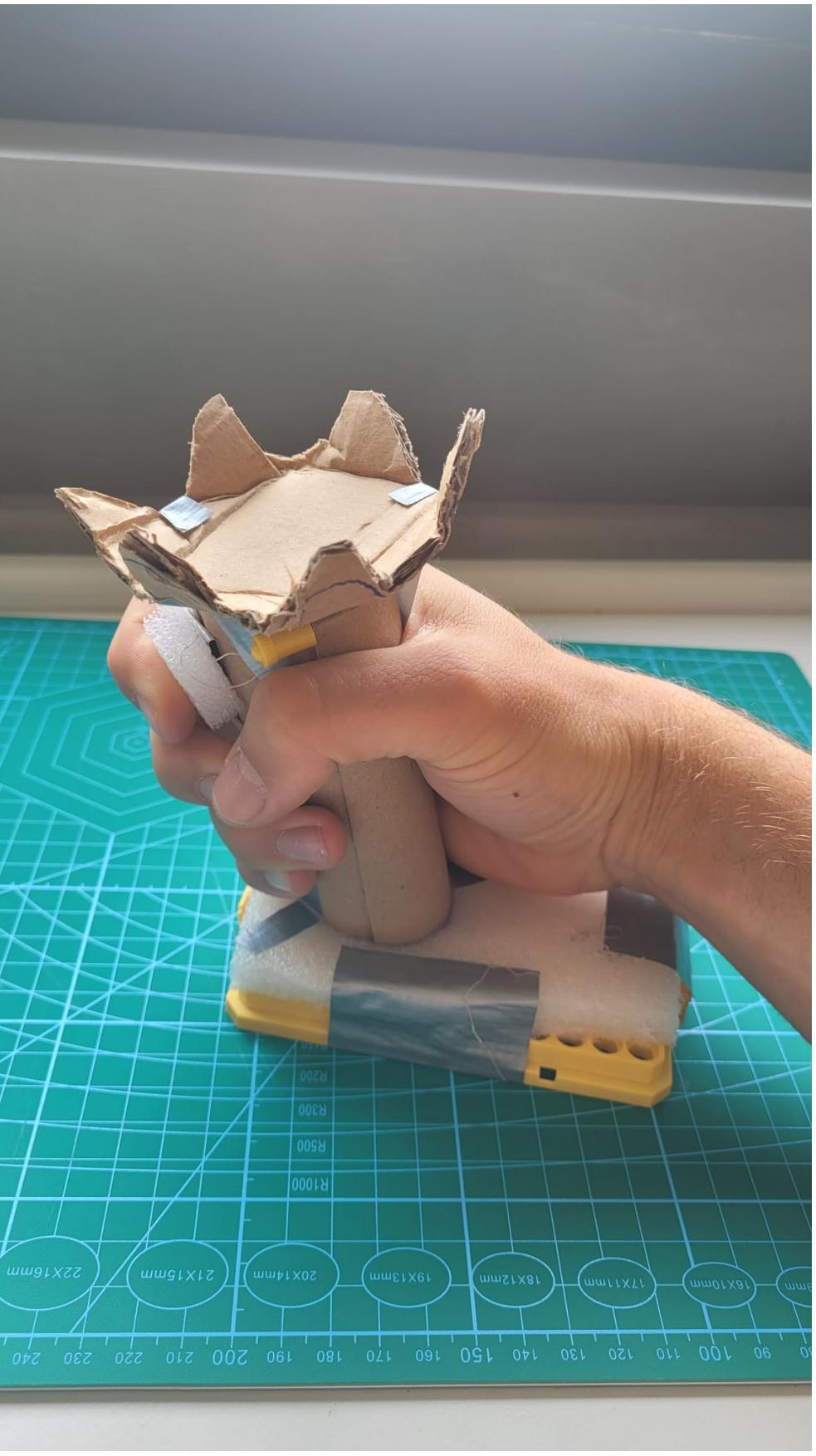
What is needed for the Spatial Mouse?



# Development Progress

# Development Progress

## First Sketch



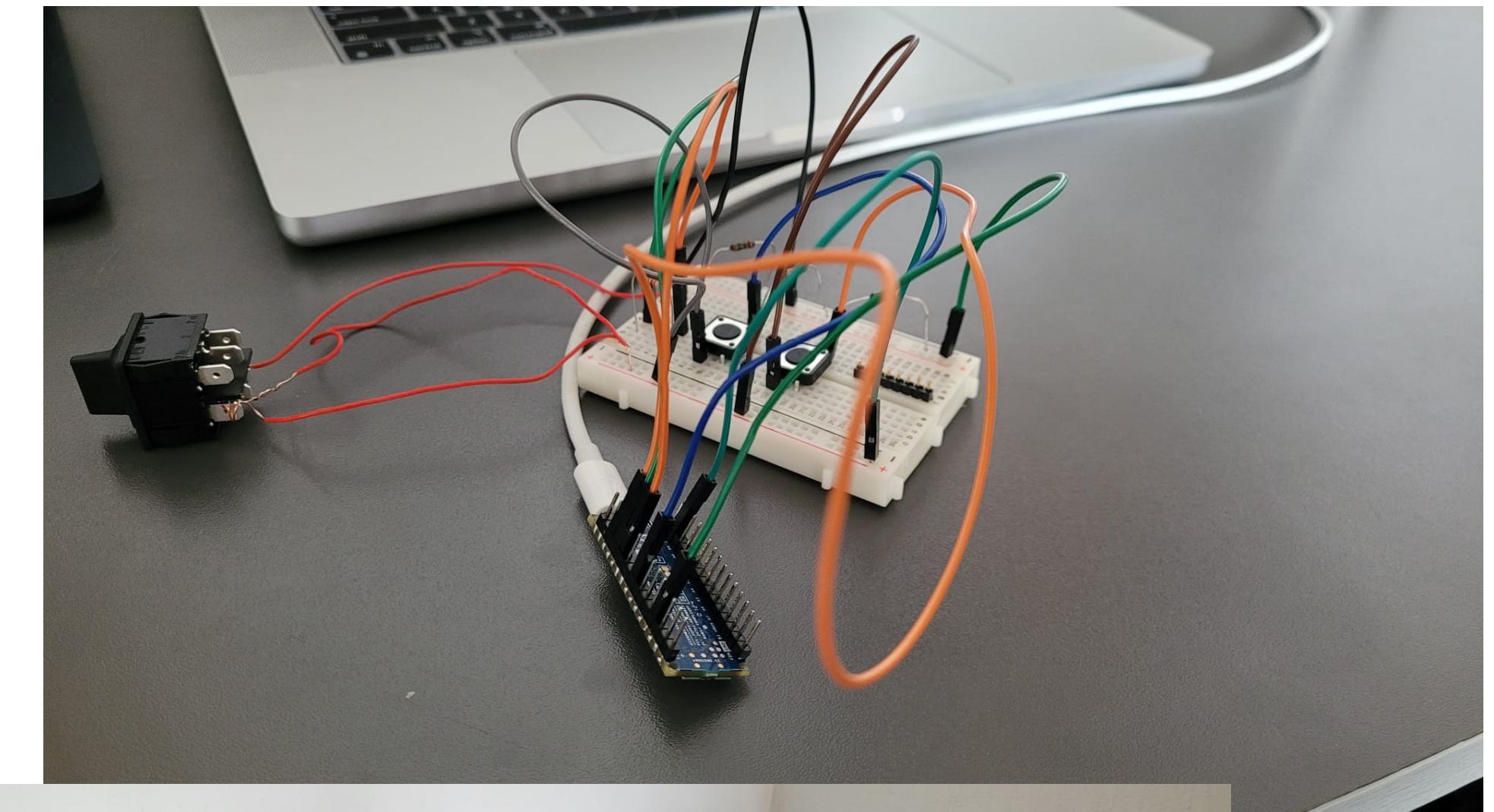
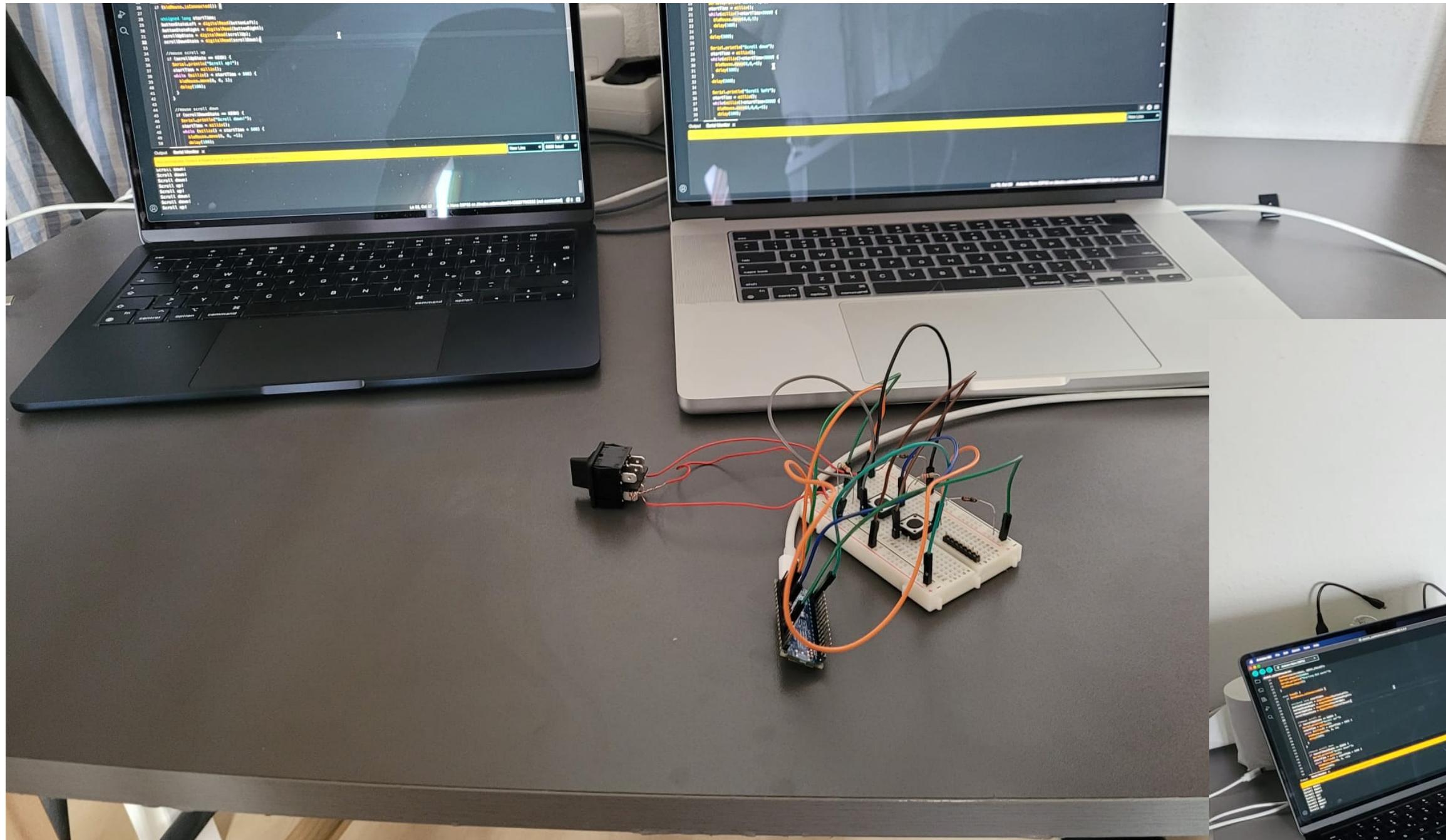
# Evaluation 1

- Method:
  - Think-aloud sketch inspection
- Results:
  - Layout surprisingly good
  - Tilt the grip



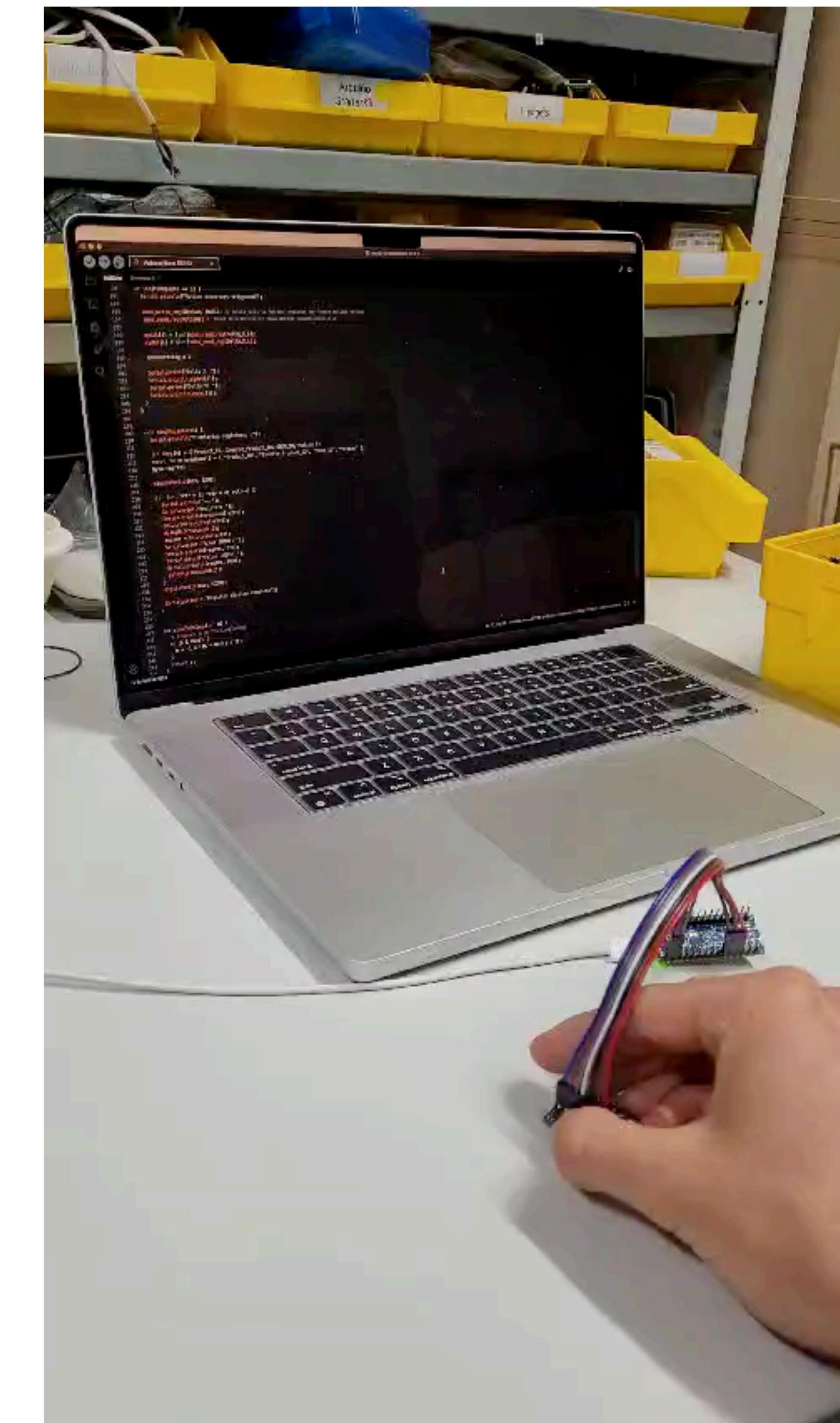
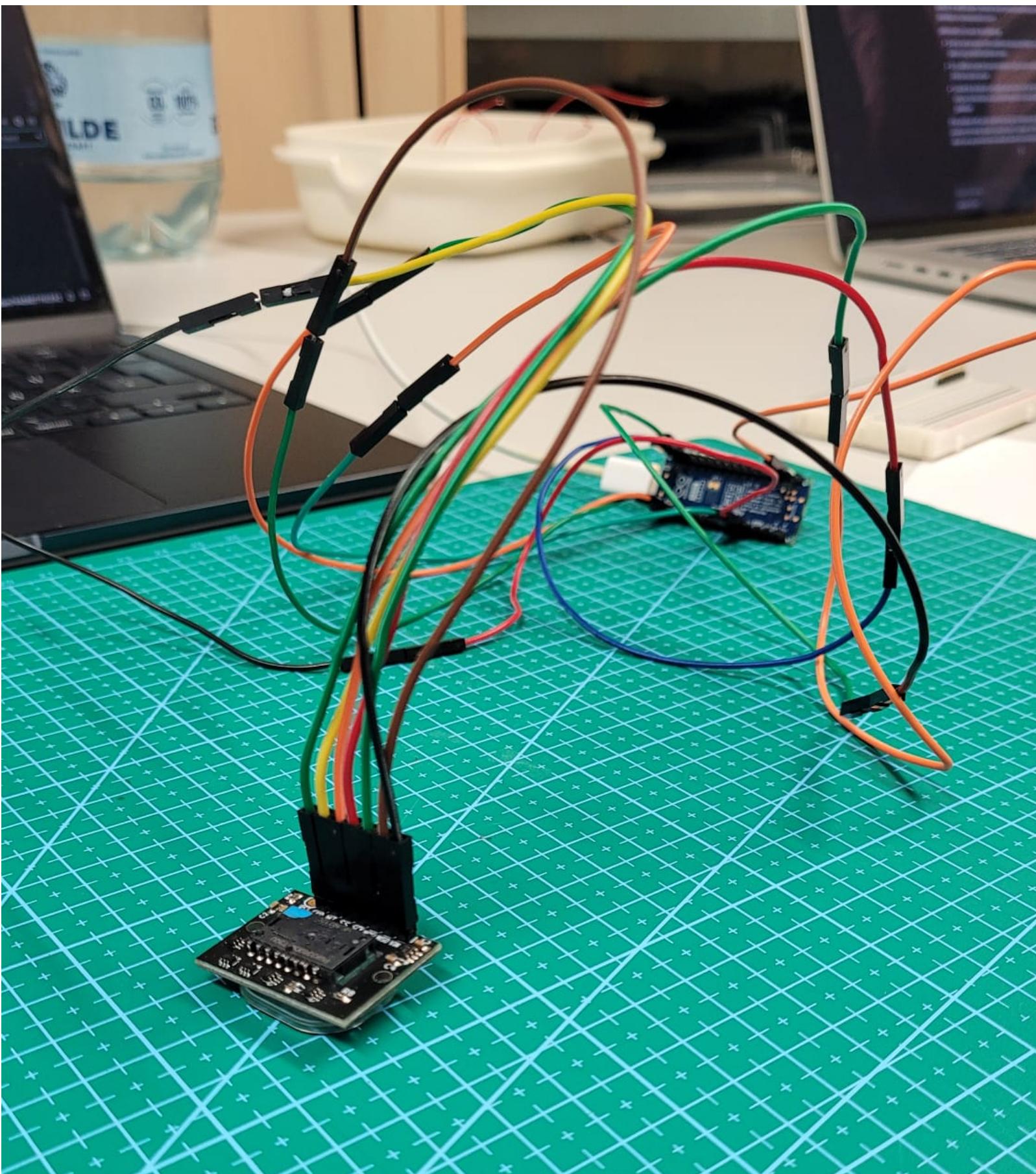
# Development Progress

## Assembling Hardware



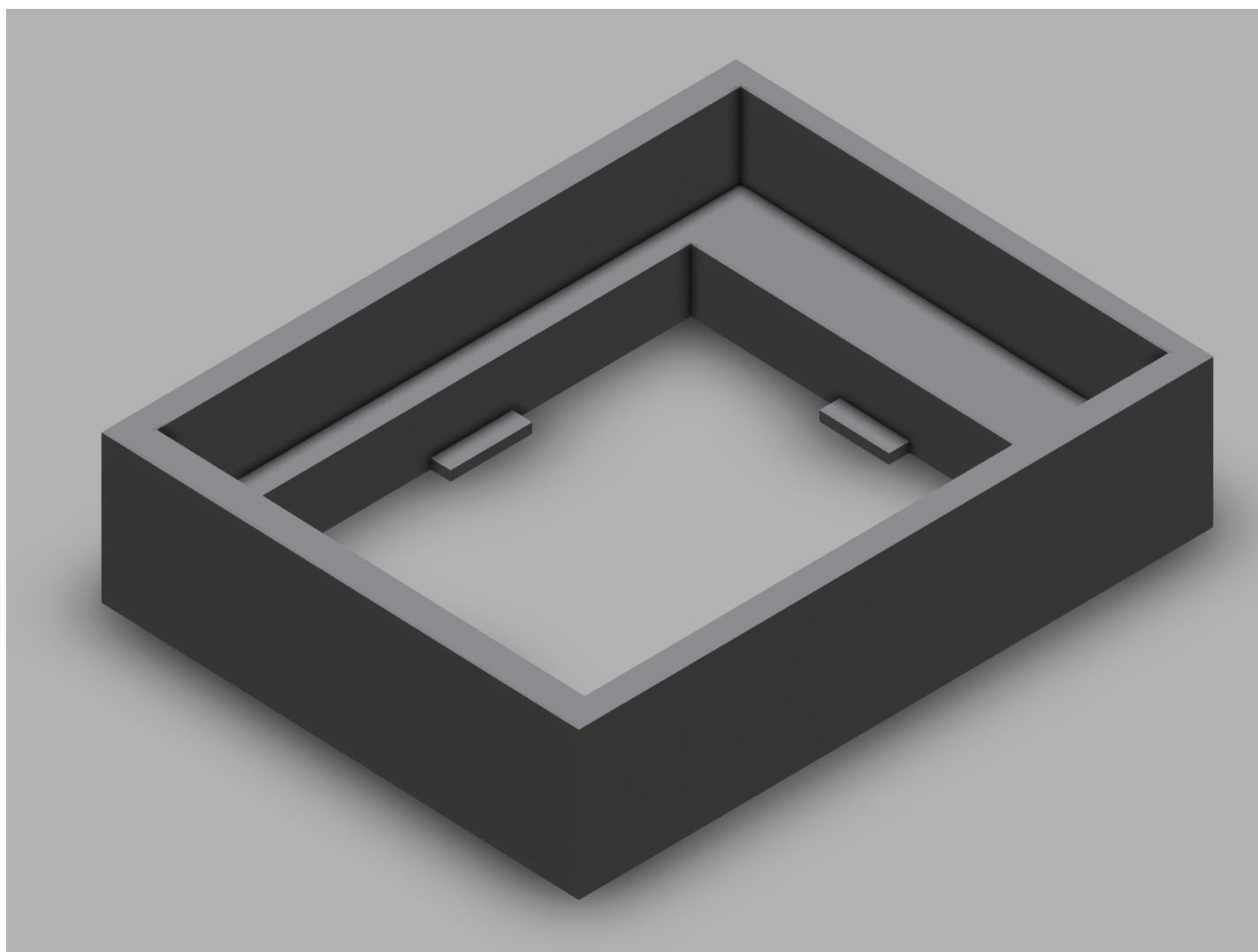
# Development Progress

## Setup Mouse Sensor



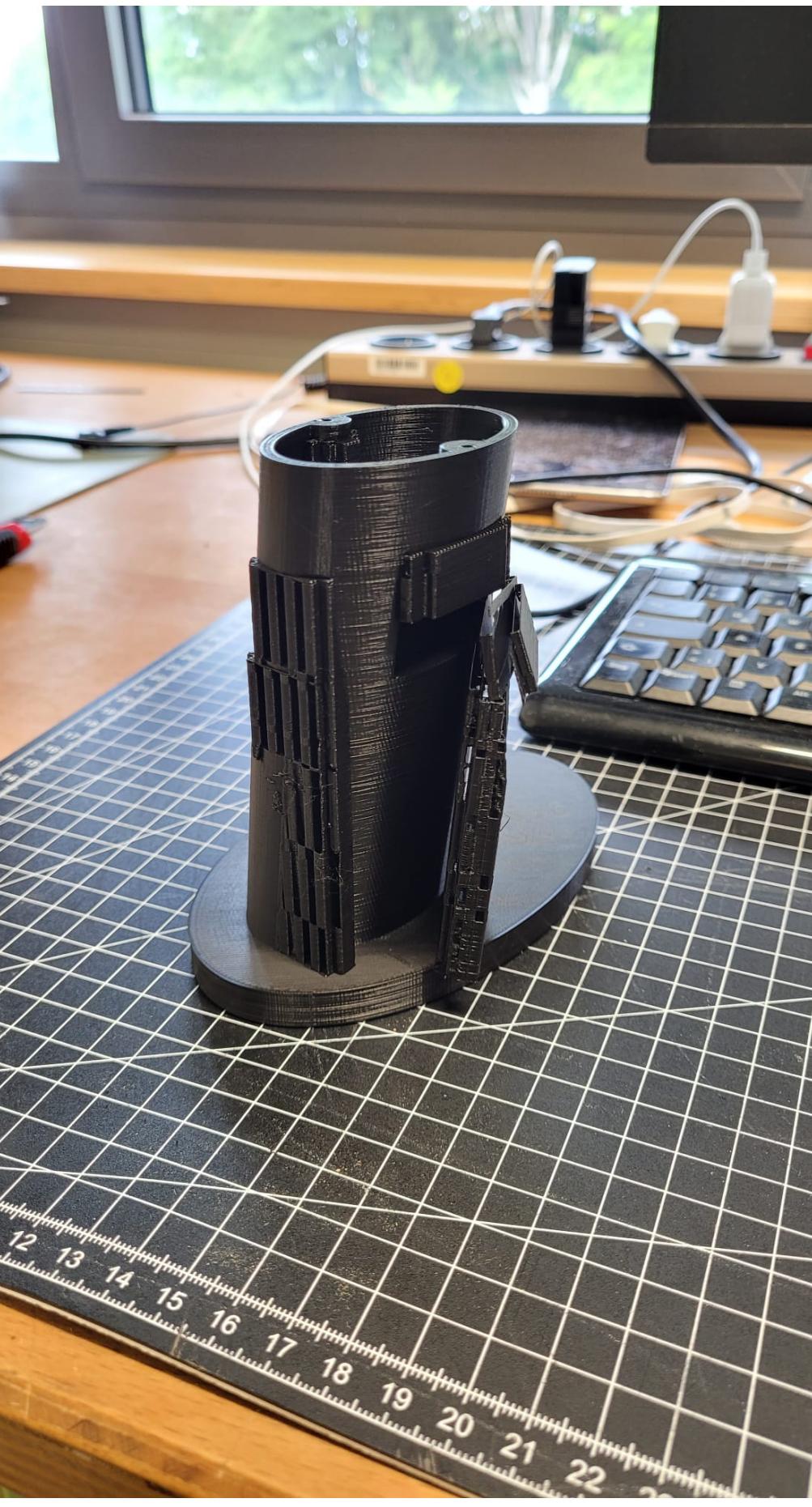
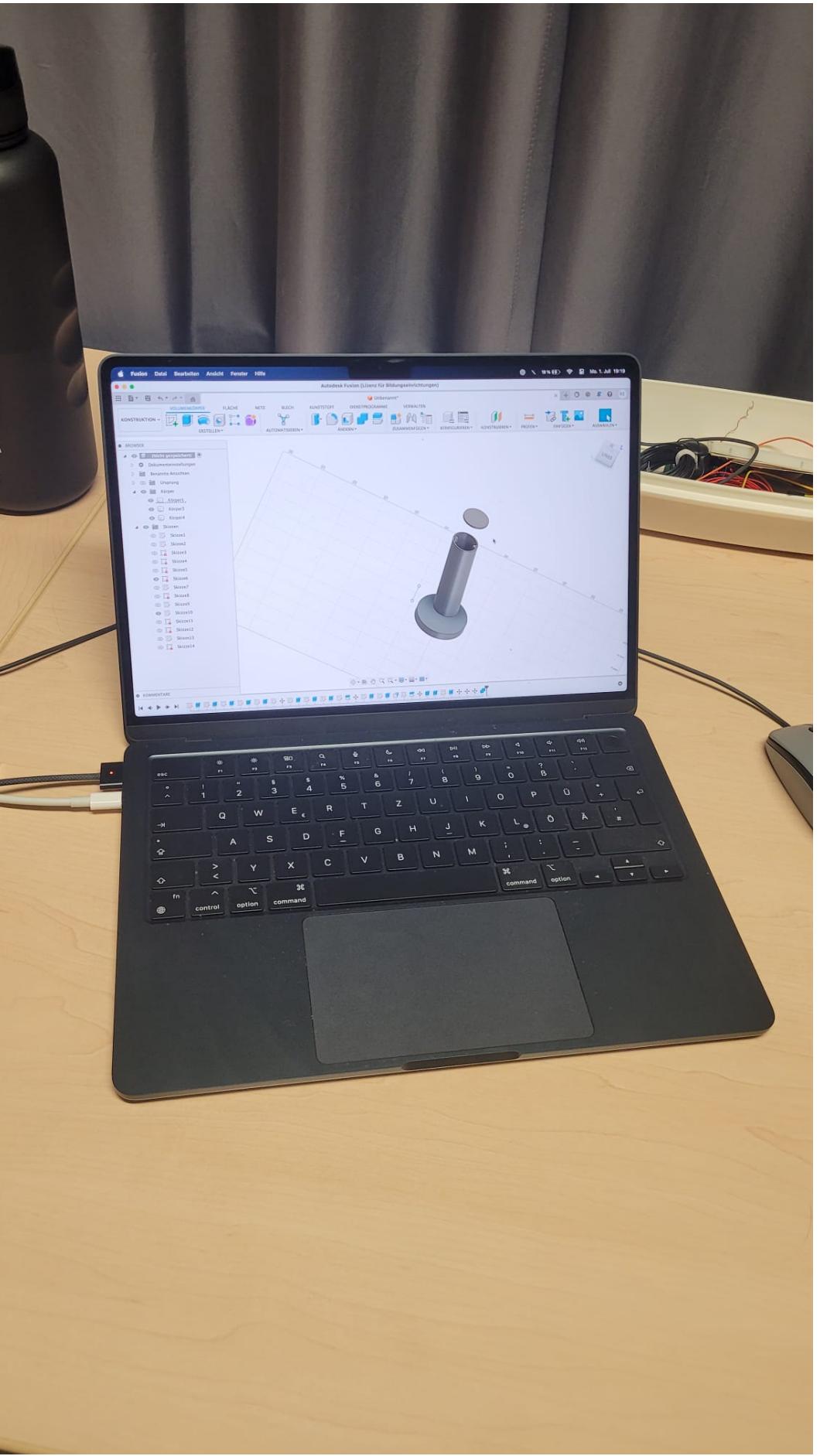
# Development Progress

## 3D Printing - Testing



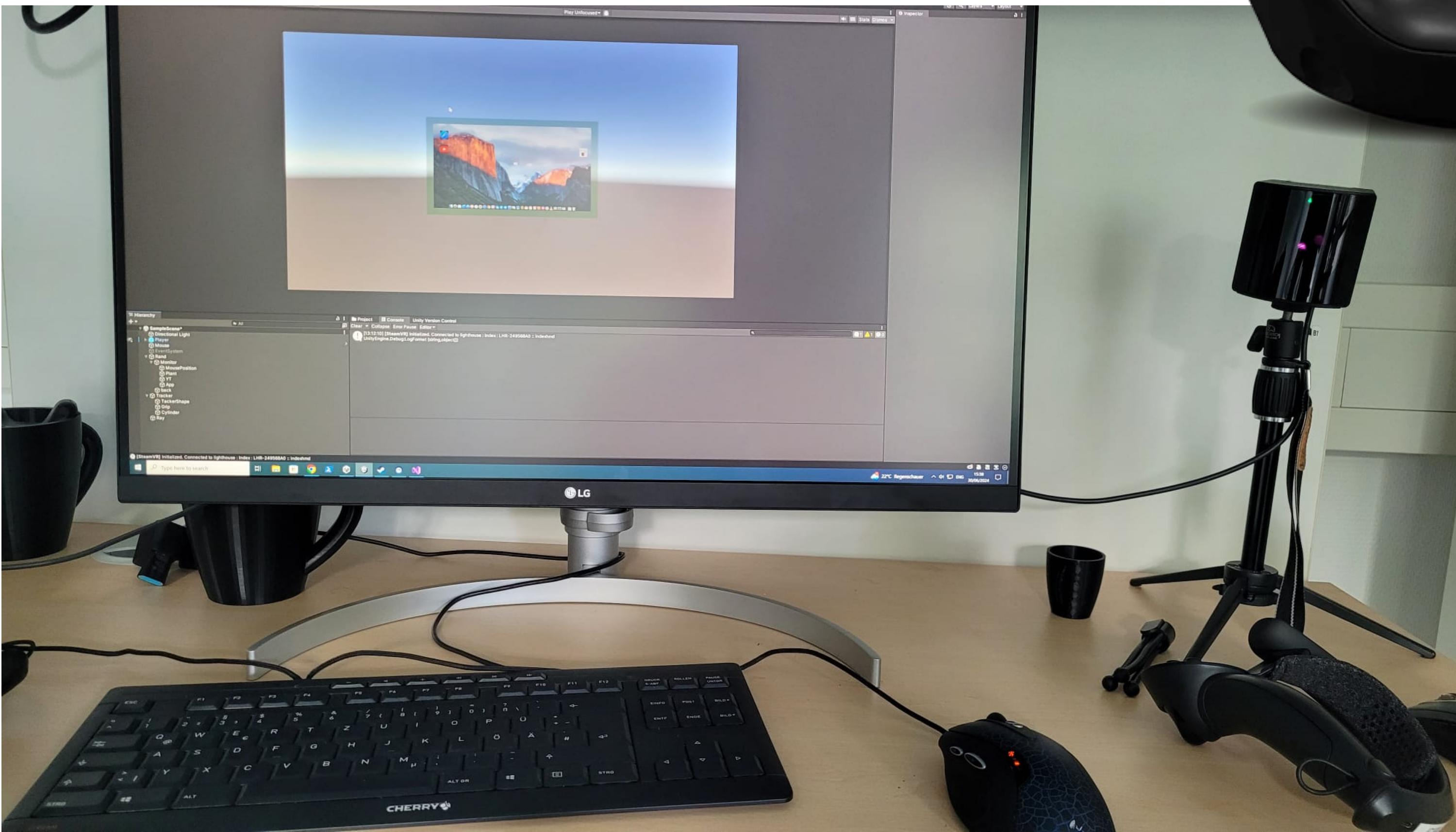
# Development Progress

## 3D Printing - Mouse Shape



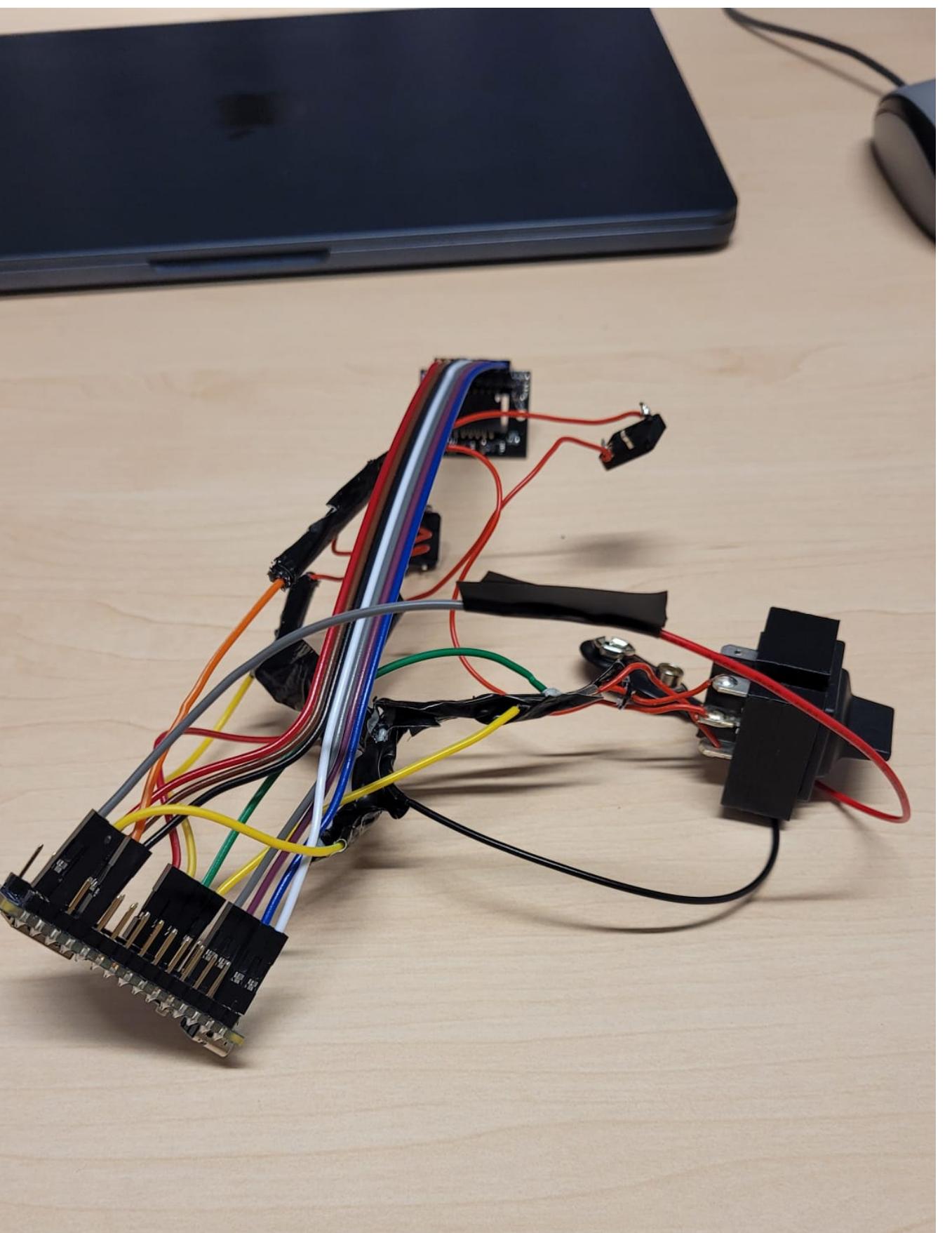
# Development Progress

## Vive Tracker + Unity



# Development Progress

## Finishing the Prototype



# Evaluation 2

- Methods:

- Think-aloud prototype inspection

- Think-aloud user task

- 3 Questionnaires

- Results:

- Layout overall good

- Cursor movement was too fast and not accurate

- Buttons too loose

## SpatialMouse

Second questionnaire

1. How difficult was it to understand the function of each button?

*Markieren Sie nur ein Oval.*



2. What was easy for you to understand?

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3. What was hard for you to understand?

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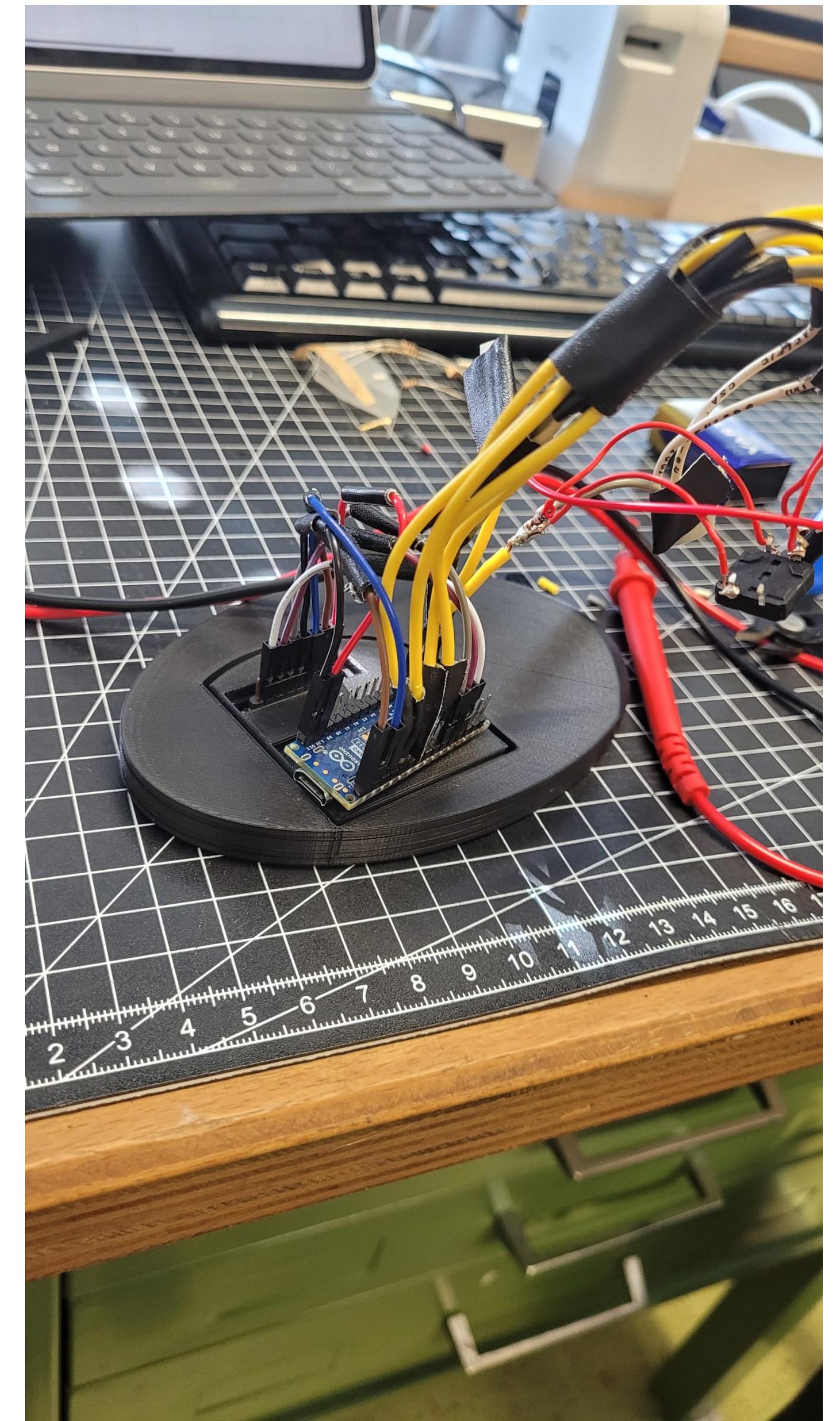
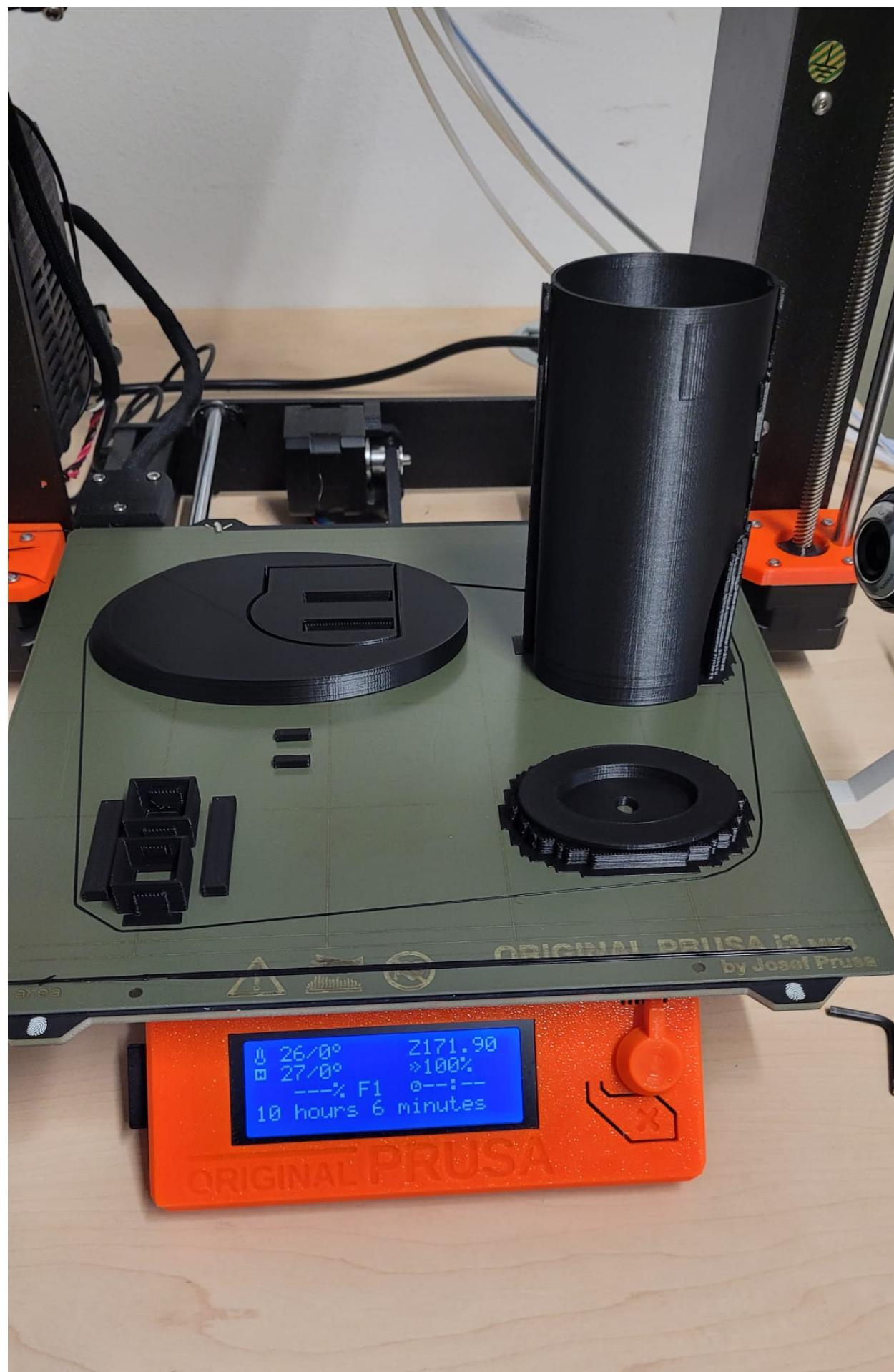
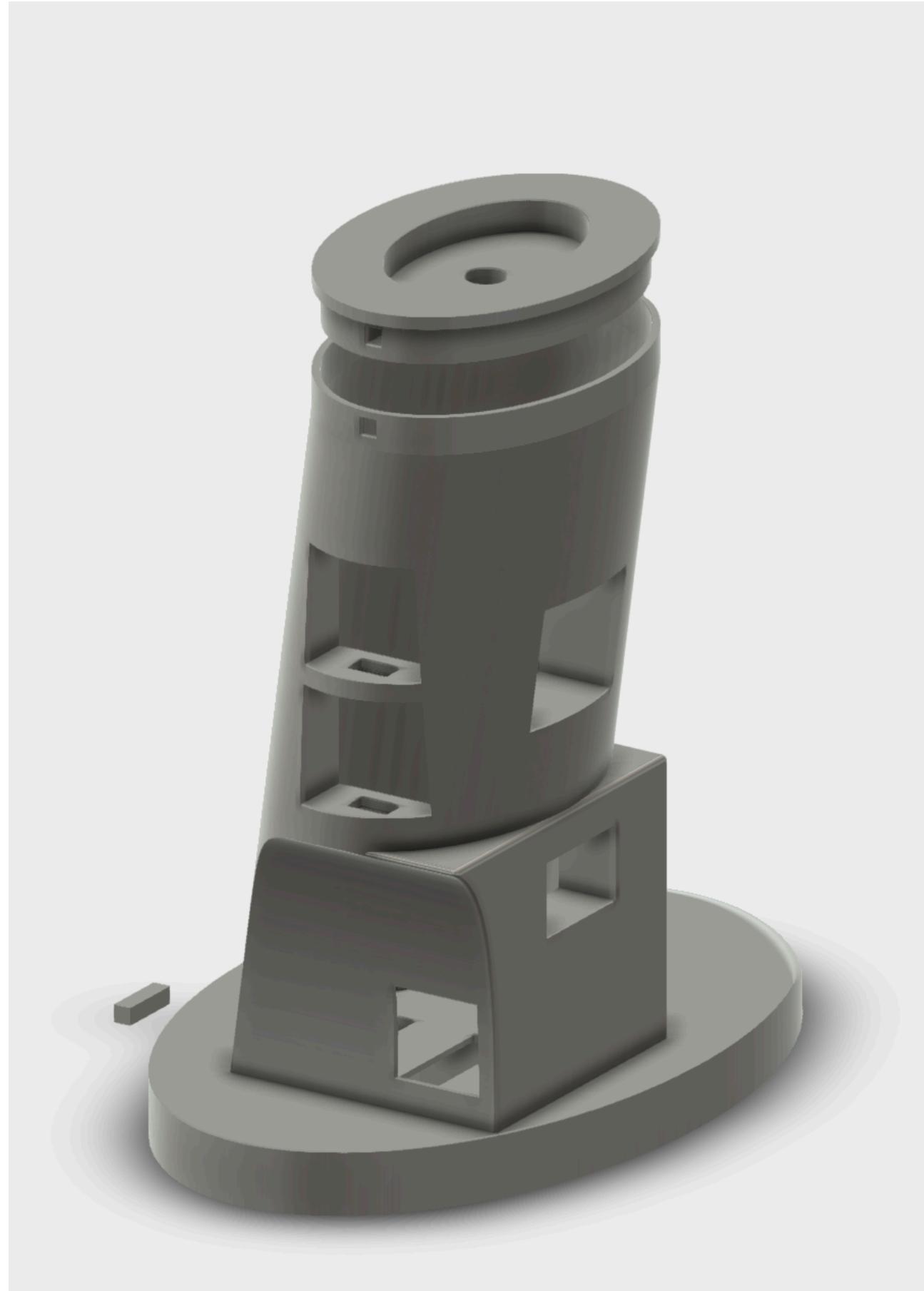
4. Did you know which button was for the left click and which one for the right click?

*Markieren Sie nur ein Oval.*

- Yes  
 No

# Development Progress

## Another Iteration



# Development Progress

## Final Product



# Final Product Features

- Functions like a computer mouse when on desk
- Functions like a VR controller when in air
- On/off switch
- Wireless connection
- Automatic mode detection (mouse or controller)



# Requirements

R1:

Spatial Mouse should have a dual-mode functionality



R2:

Spatial Mouse should have an ergonomic design

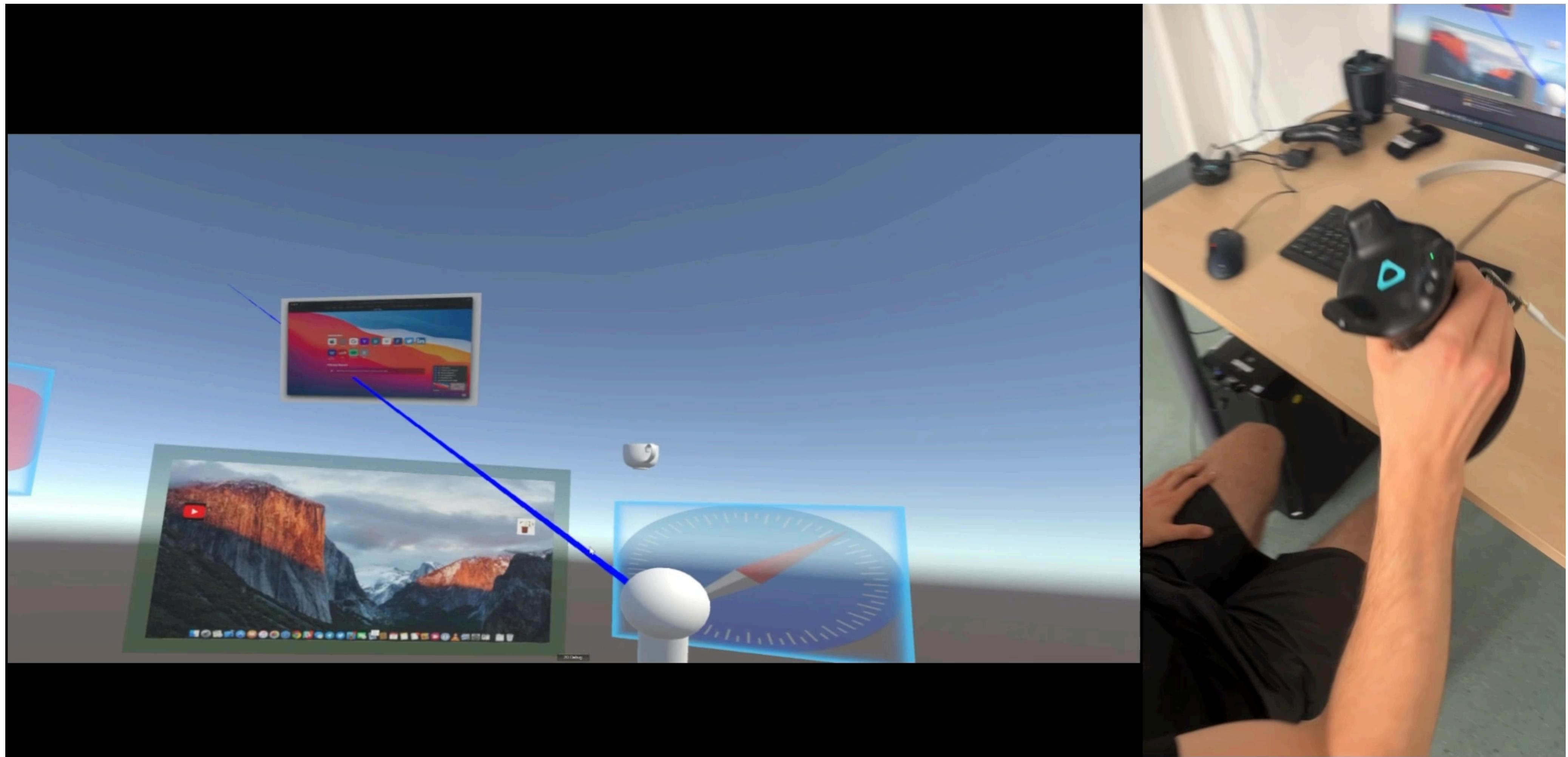


R3:

Spatial Mouse should support context-aware interactions



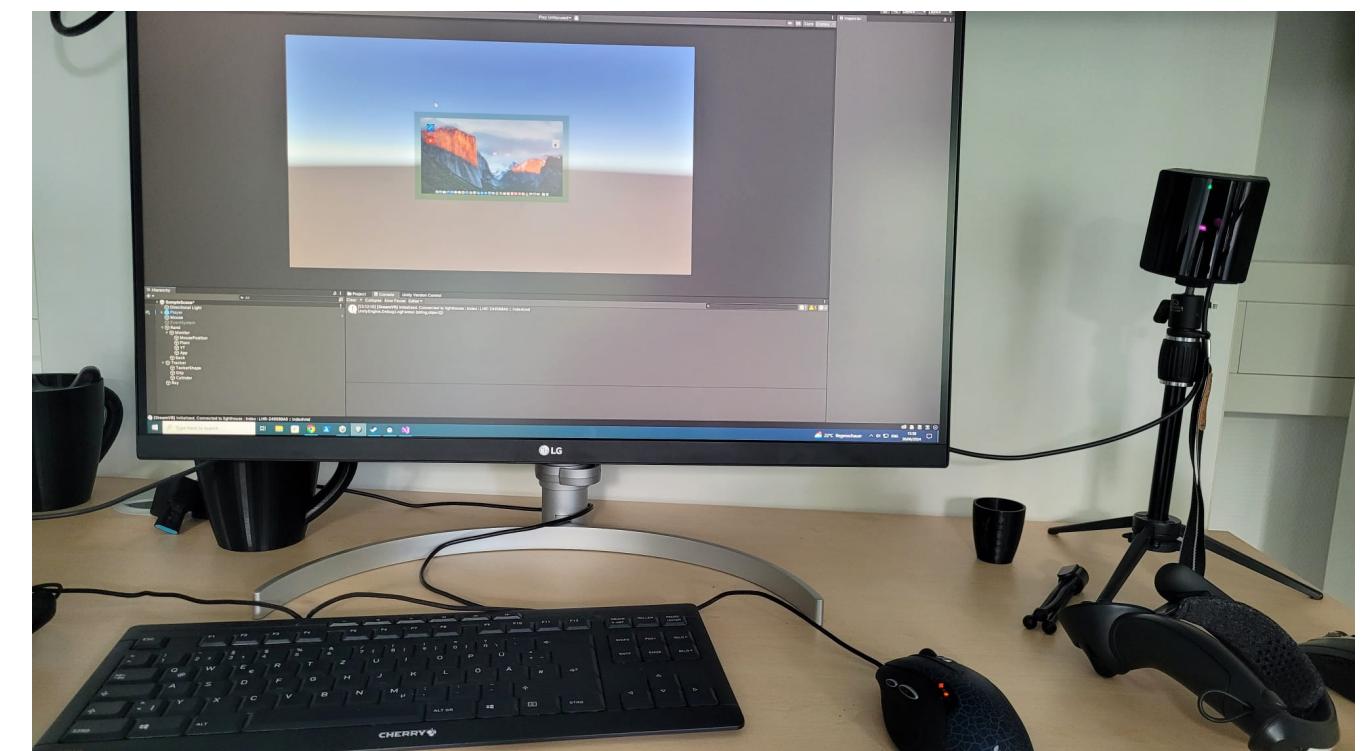
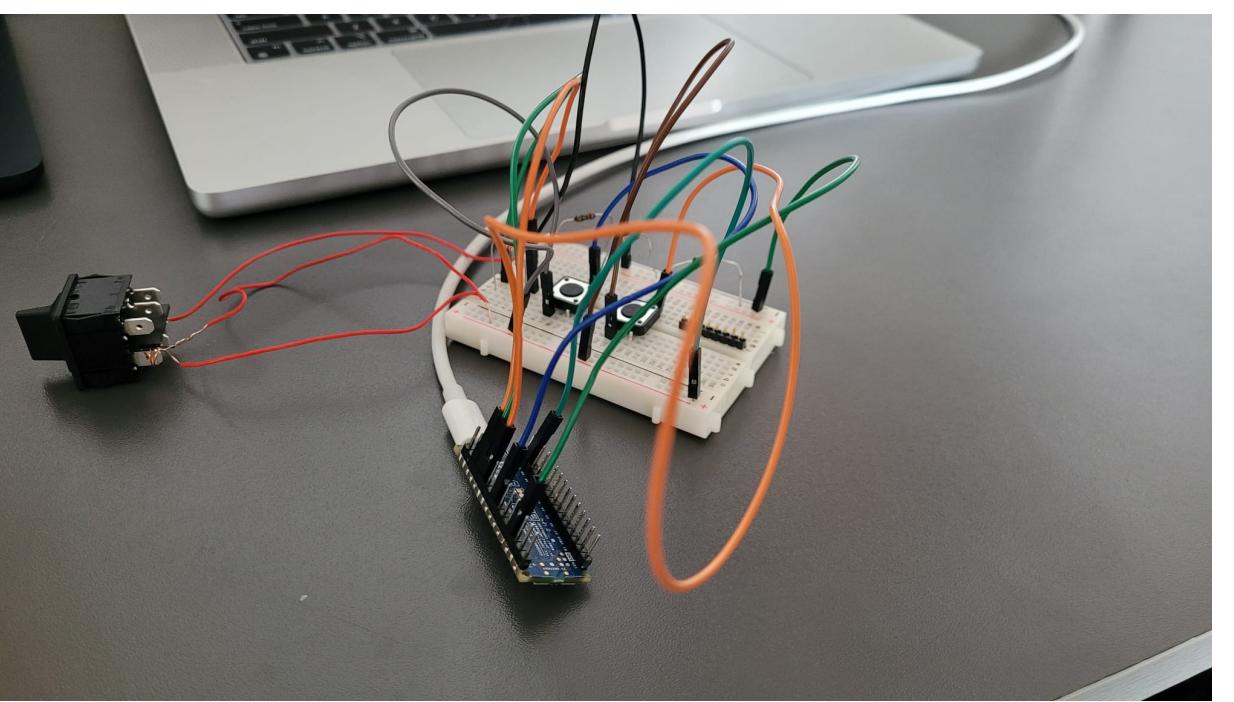
# Final Product



# Lessons learned and Outlook

# Lessons learned

- Learned about basic energy circuits + soldering
- Learned Arduino hardware + IDE
- Learned 3D printing + Fusion 360 + Prusa Slicer
- Extended Unity skills



# Limitations

- Mouse cursor motion delay
- Improve shape
- Improve buttons/scroll-switch (shape, size, feedback)



# Outlook

- Robin will continue working on the Spatial Mouse:
- Build user study in his Bachelor Project
- Evaluate concept this in his Bachelor Thesis



# Demo time!