

# Double-Filter System

Track 1 (Onsite-Online)



CAIRO

Center for Artificial Intelligence and Robotics

Markus Ebner, Steffen Kastner, Markus Bullmann, Toni Fetzer, Frank Deinzer



**IPIN 2023**

THIRTEENTH INTERNATIONAL CONFERENCE ON

**INDOOR POSITIONING  
AND INDOOR NAVIGATION**

25<sup>th</sup>-28<sup>th</sup> Sep. 2023, Nuremberg Germany

**NUREMBERG**



# Statistics

## Museum Building:

Ground: ~100m x 35m = 3500m<sup>2</sup>

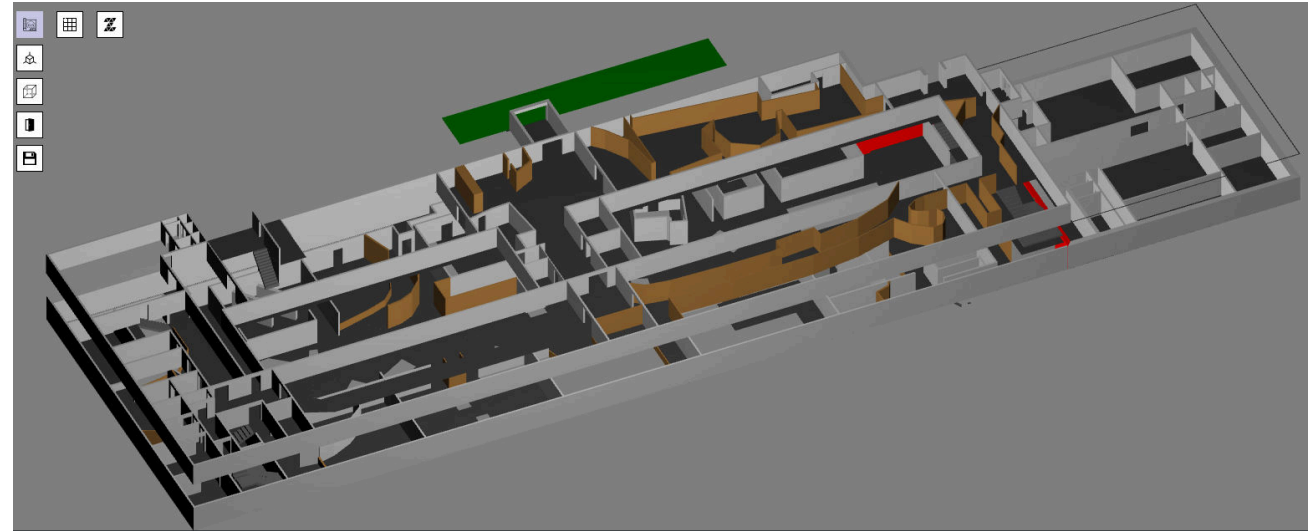
Floors: 2

---

Total: ~7000m<sup>2</sup>

$$160 \text{ FPs} = \frac{0.023 \text{ FP}}{\text{m}^2} = \frac{1 \text{ FP}}{44 \text{ m}^2}$$

$$160 \text{ FP} \cdot \frac{1 \text{ min}}{1 \text{ FP}} = 160 \text{ min}$$



# Statistics

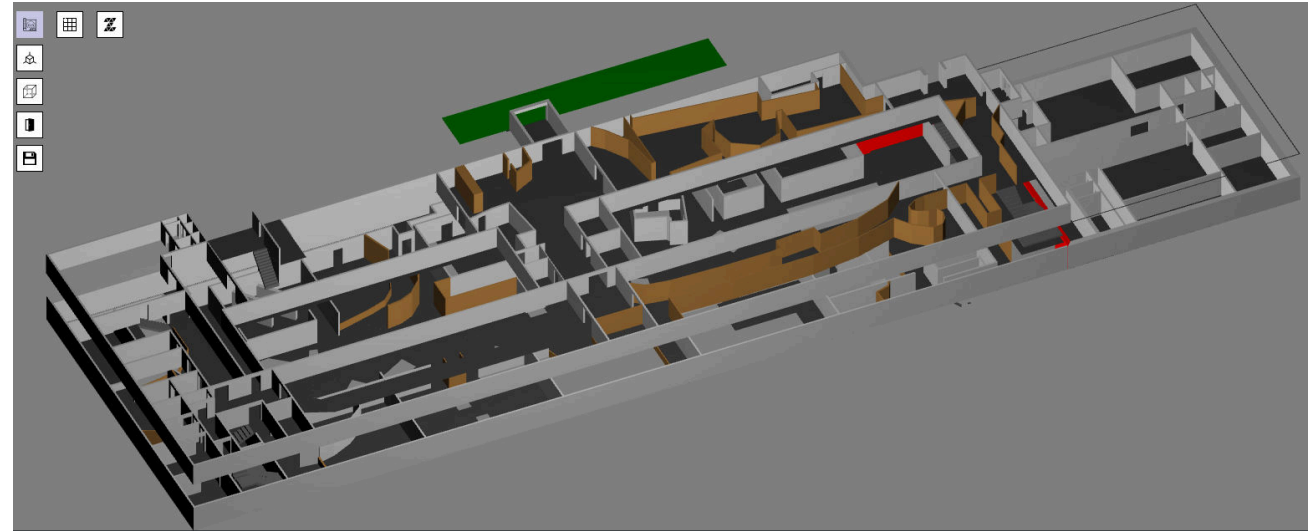
## Museum Building:

Ground: ~100m x 35m = 3500m<sup>2</sup>

Floors: 2

---

Total: ~7000m<sup>2</sup>



$$160 \text{ FPs} = \frac{0.023 \text{ FP}}{\text{m}^2} = \frac{1 \text{ FP}}{44 \text{ m}^2}$$

$$160 \text{ FP} \cdot \frac{1 \text{ min}}{1 \text{ FP}} = 160 \text{ min}$$

**8h**

# Statistics

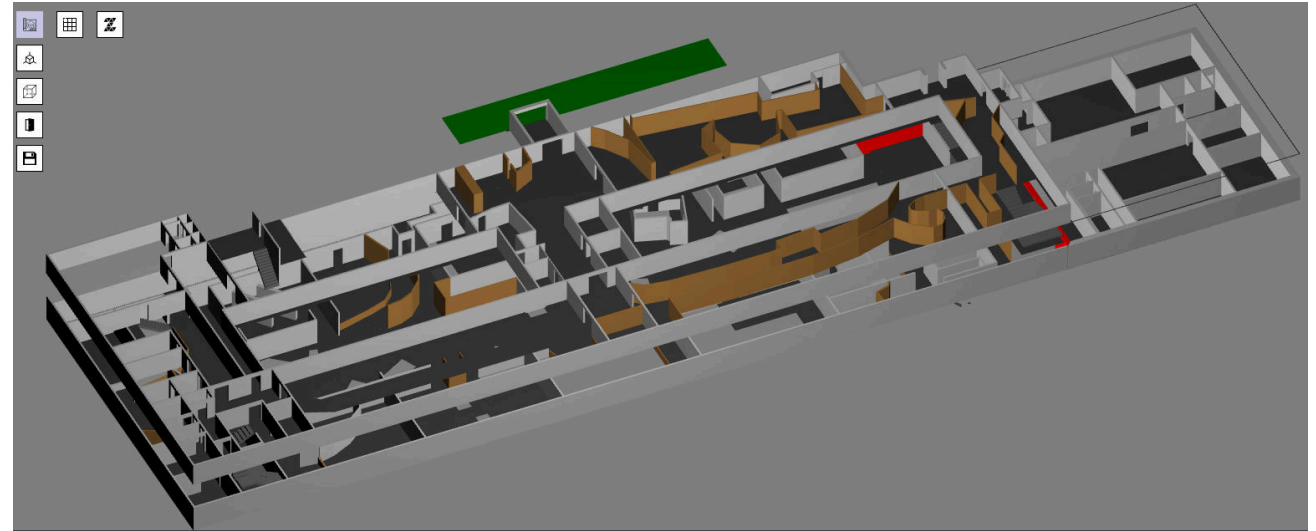
## Museum Building:

Ground: ~100m x 35m = 3500m<sup>2</sup>

Floors: 2

---

Total: ~7000m<sup>2</sup>



$$160 \text{ FPs} = \frac{0.023 \text{ FP}}{\text{m}^2} = \frac{1 \text{ FP}}{44 \text{ m}^2}$$

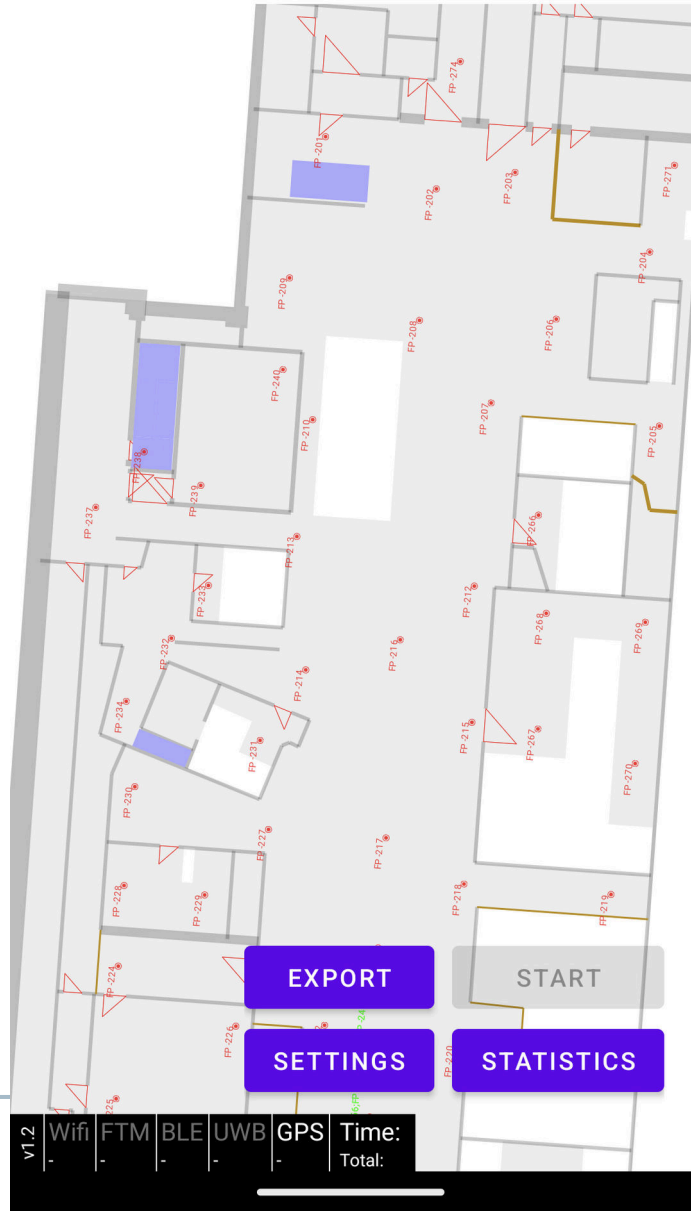
$$160 \text{ FP} \cdot \frac{1 \text{ min}}{1 \text{ FP}} = 160 \text{ min}$$

**8h + 8h**

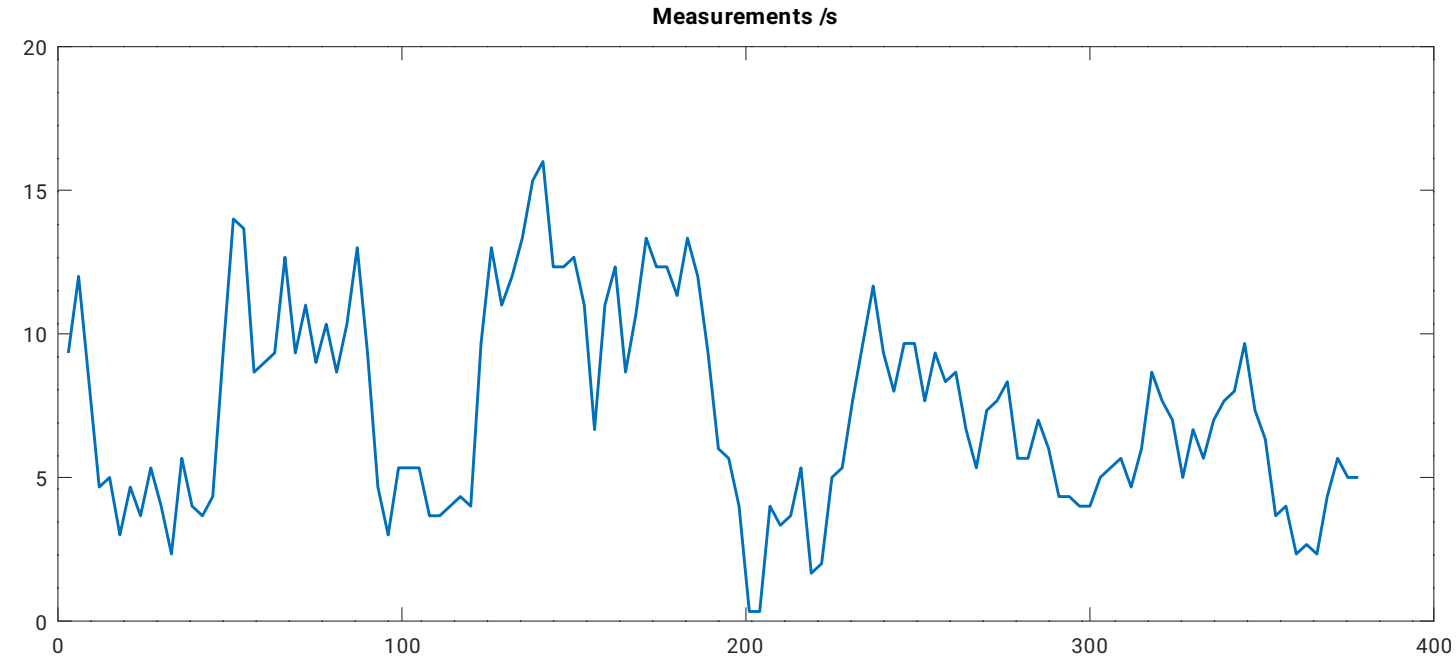
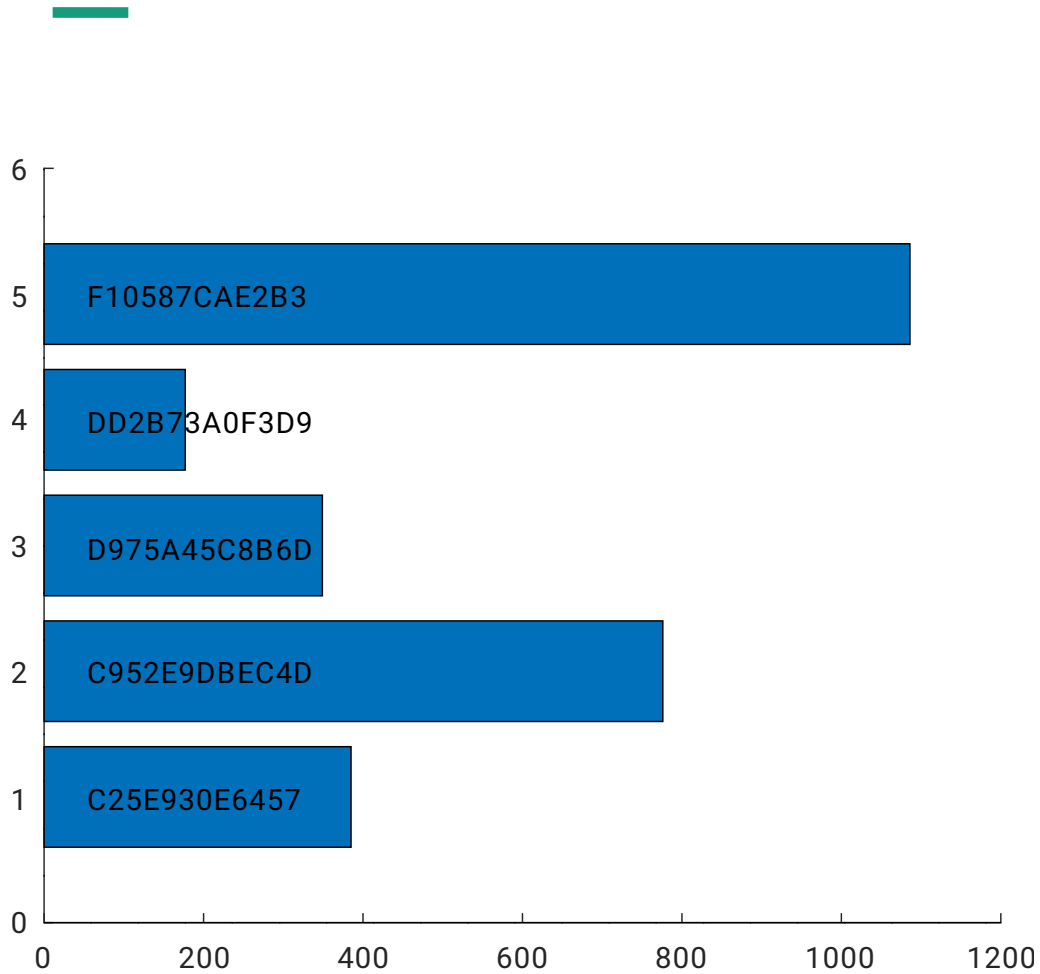
# Problems

## SensorFingerprint

-2



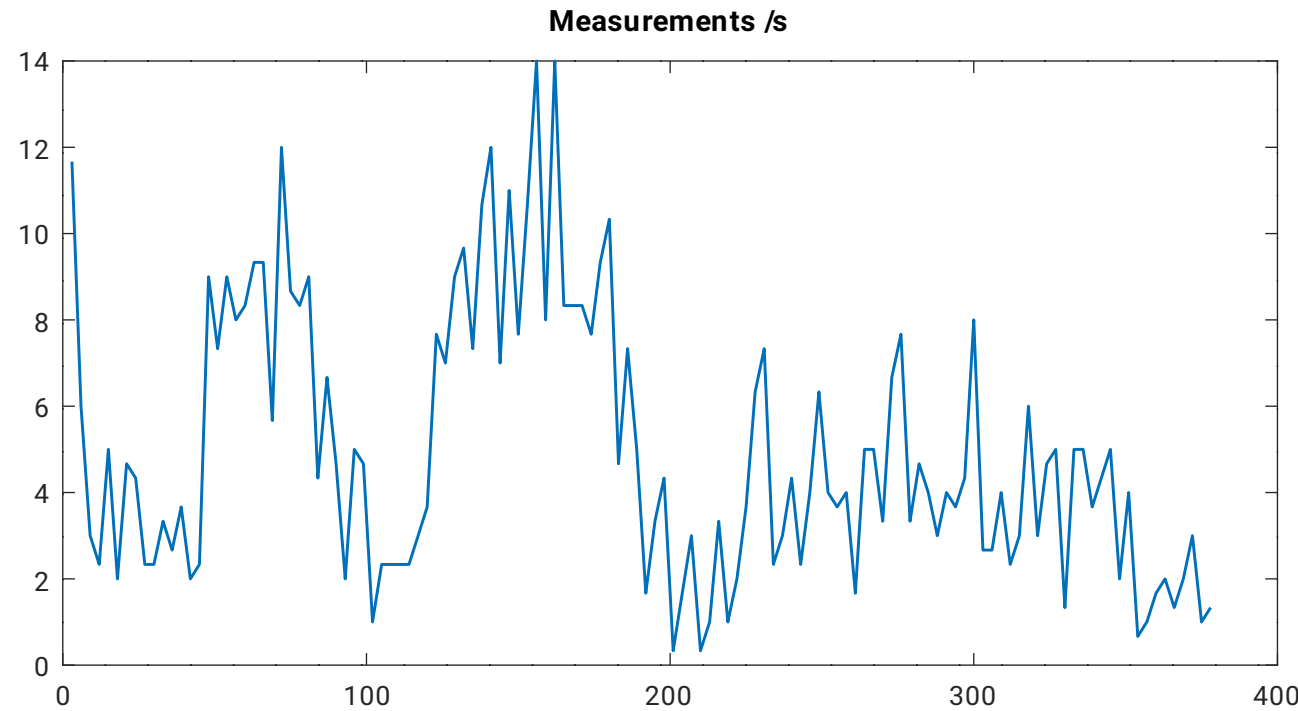
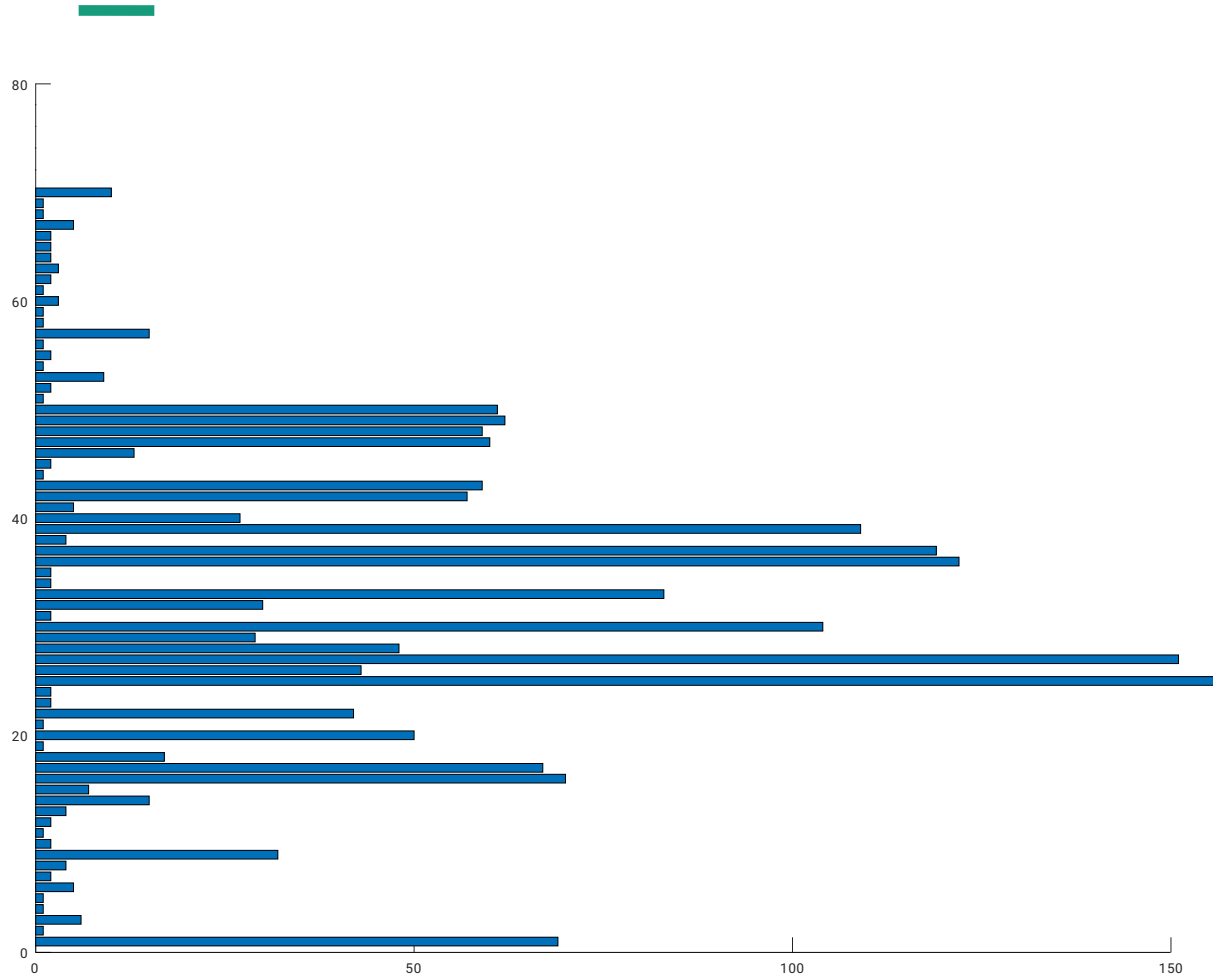
# Statistics (BLE)



Usable Beacons: 5

Avg. Samplerate: 7.34/s

# Statistics (WiFi)



Usable WiFi APs: 412

Avg. Samplerate: 5.01/s

# Results

---

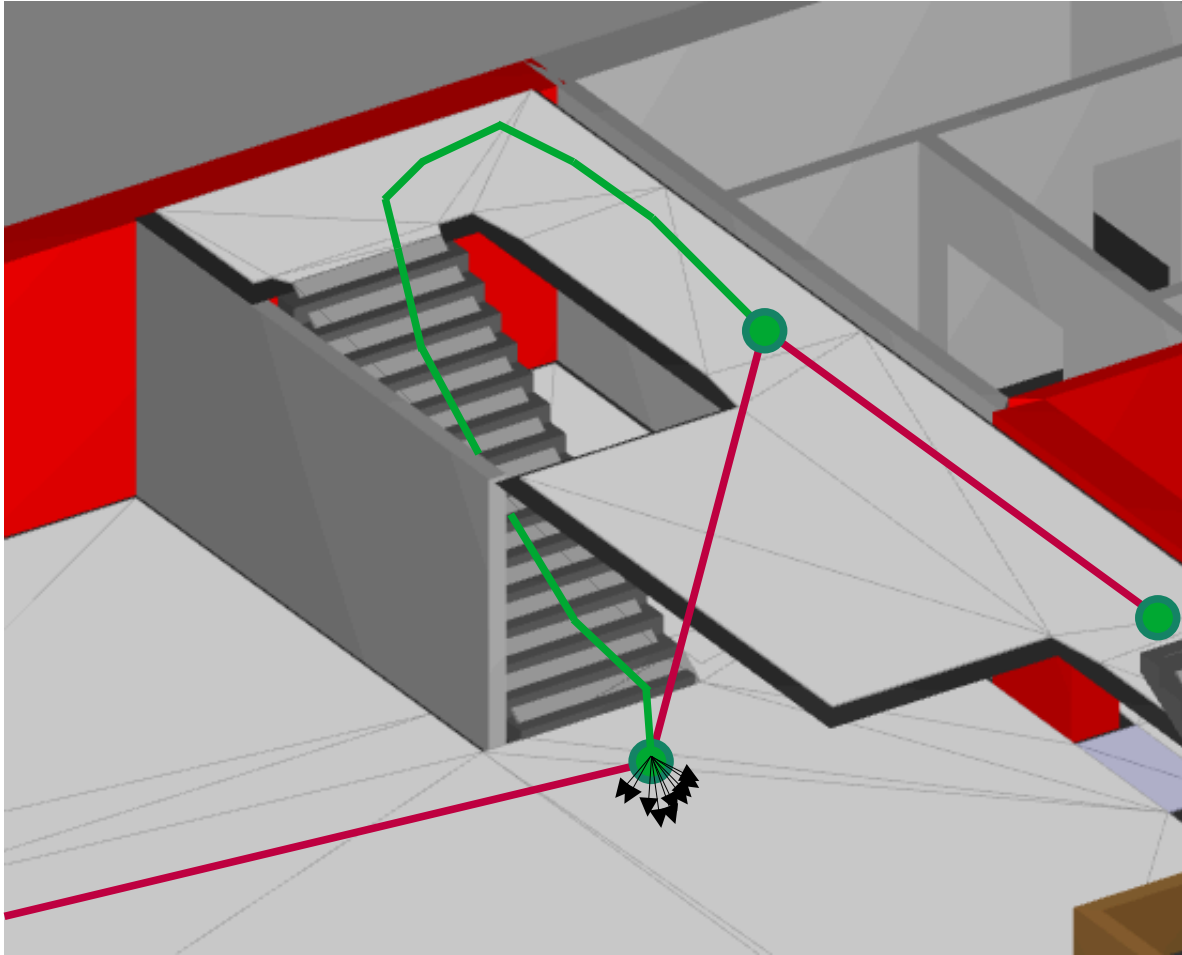
Track 1: 2.8m

Track 3: 5.3m

75% Quantile

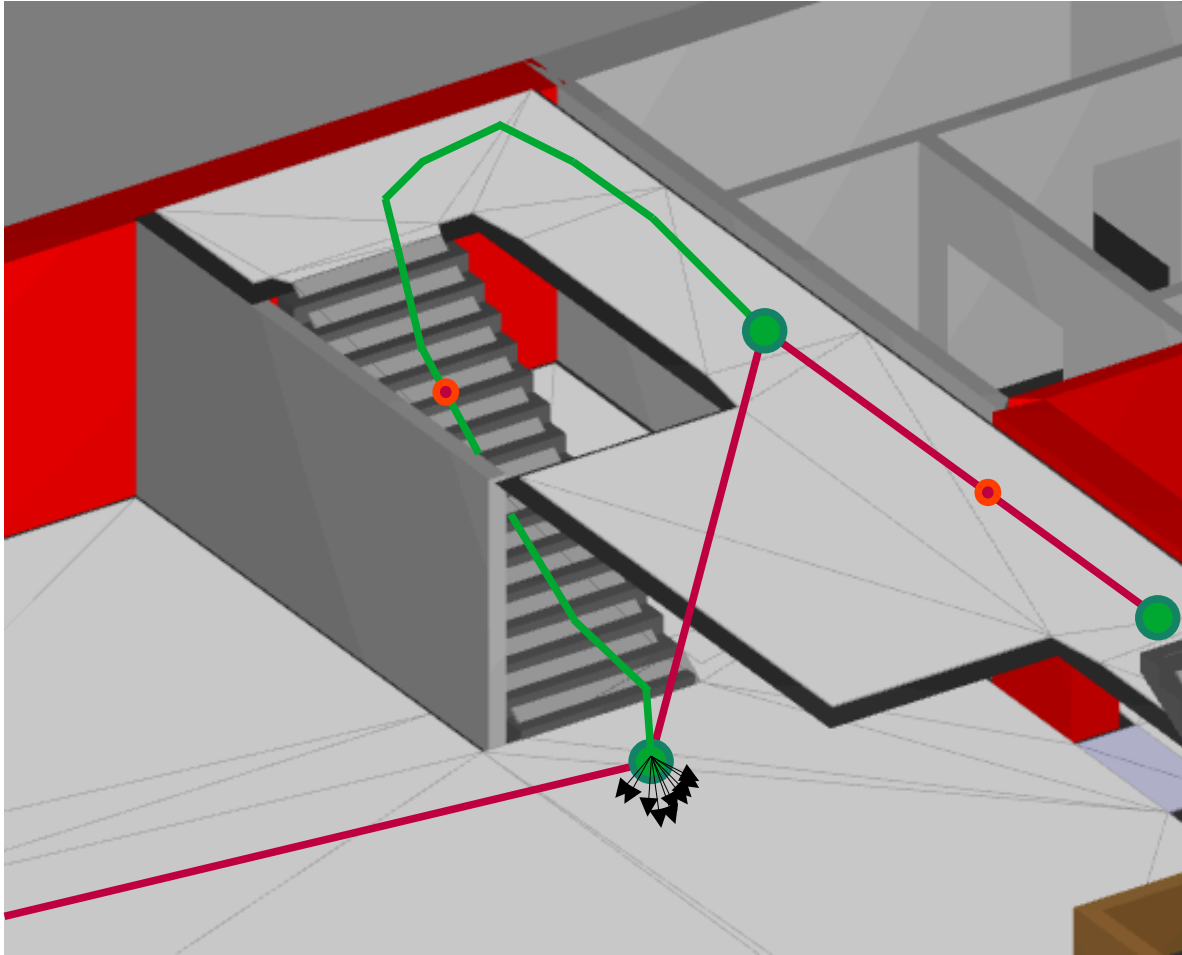


# Track 1 vs Track 3



Avg. Samplerate: 5.01/s

# Track 1 vs Track 3



Avg. Samplerate: 5.01/s

Avg. Scanrate:  $\frac{1}{4 \text{ sec}}$

**Thank You**