

# **RSSI model evaluation in heavy industry conditions**

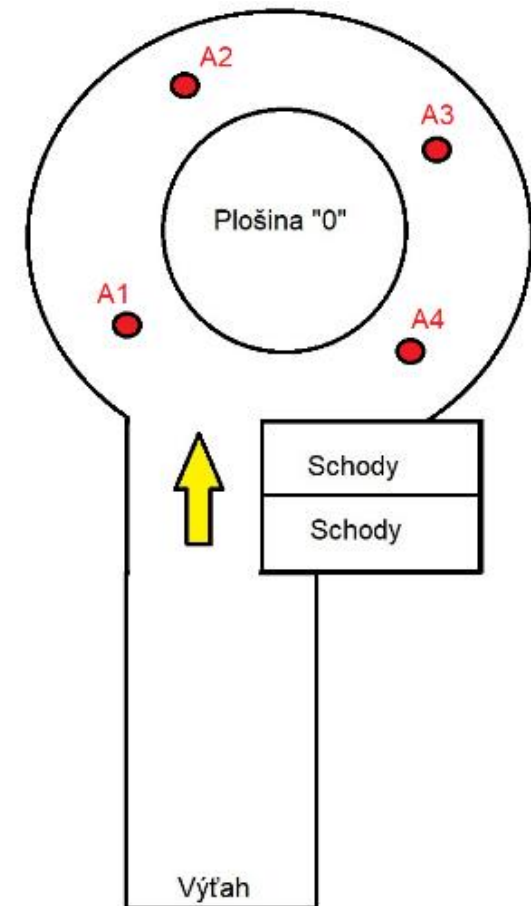
## **Blast furnace experiment**

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**Authors: FIIT STU, EMM spol. s r.o.**

# Scenario overview – one platform

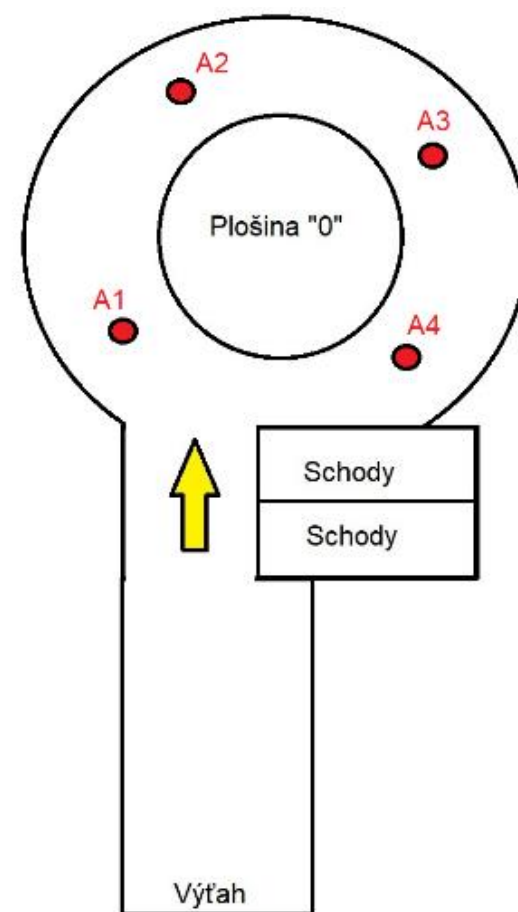
- One platform, 4 receiving antennas as illustrated
- **1 worker with tag moving in different ways**
- Positioning **accuracy to sector (closest antenna, between antennas)**, provides real-time location updates for the moving object
- **Flexible solution** combining hardware components, Bluetooth Low Energy (BLE) devices and custom-made applications



# Test #1-4

- Worker is moving around the platform **slow speed counter-clockwise**  
**7.3.2023 12:23:45 – 12:24:35**

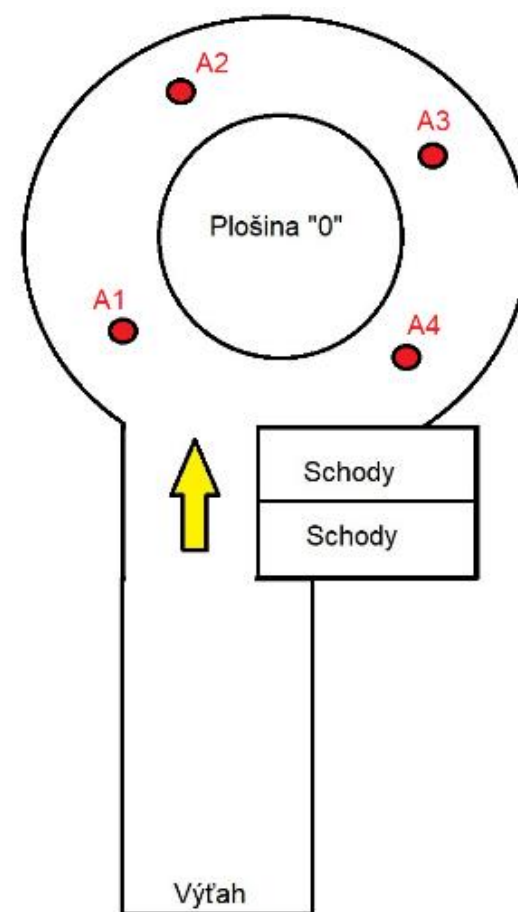
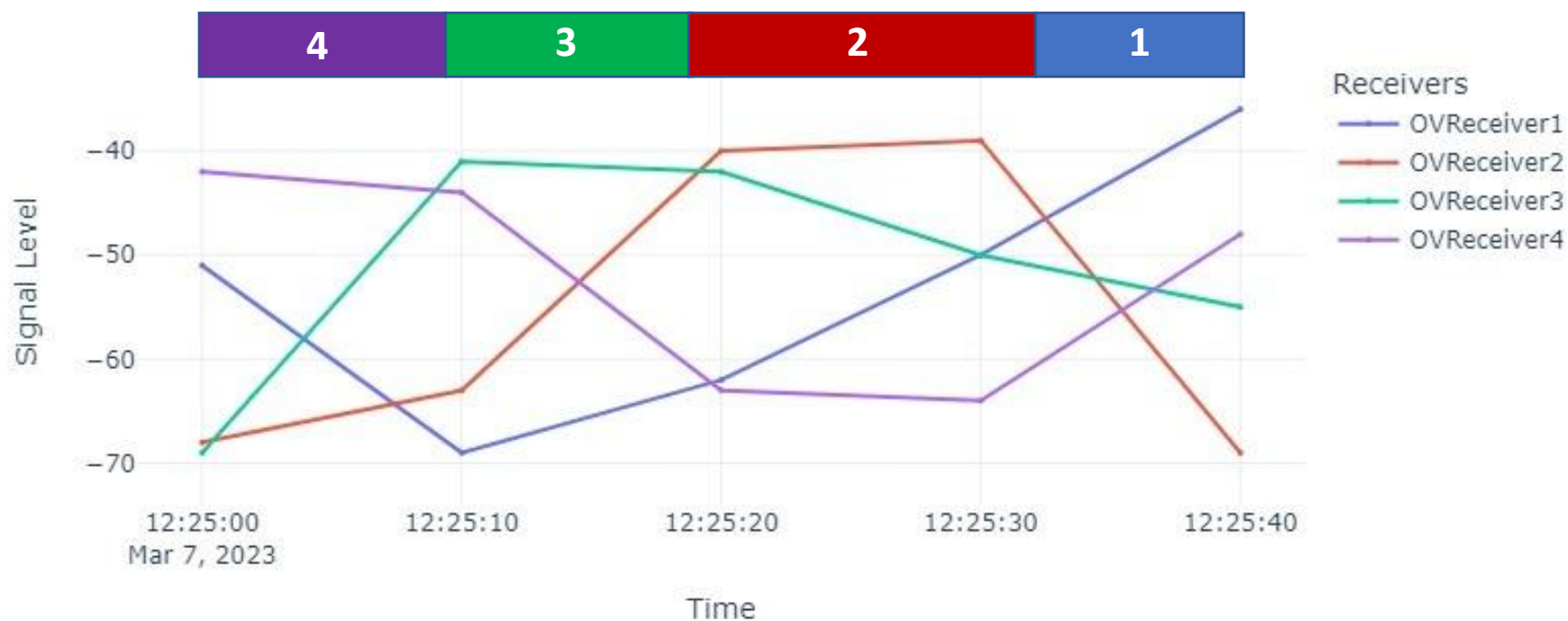
Signal of 'a4:da:22:e0:e3:3b' over time



# Test #1-5

- Worker is moving around the platform **fast speed counter-clockwise**  
**7.3.2023 12:25:00 – 12:25:40**

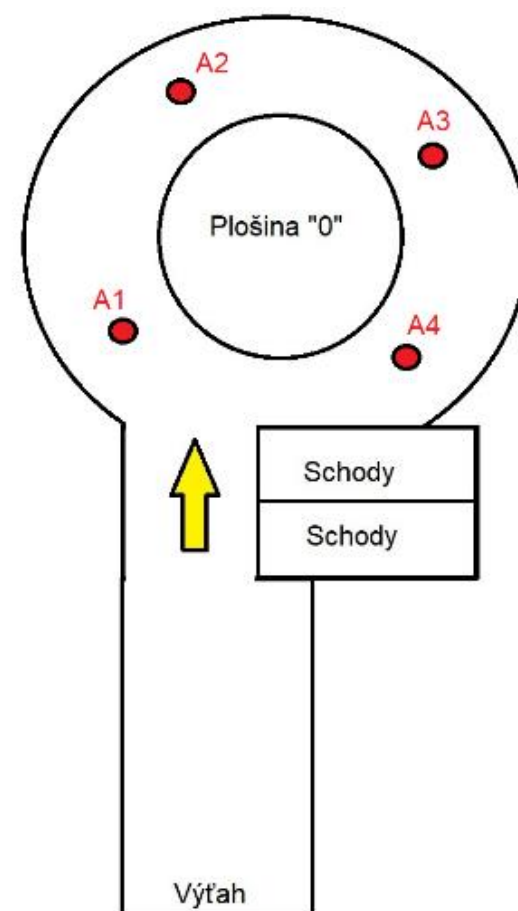
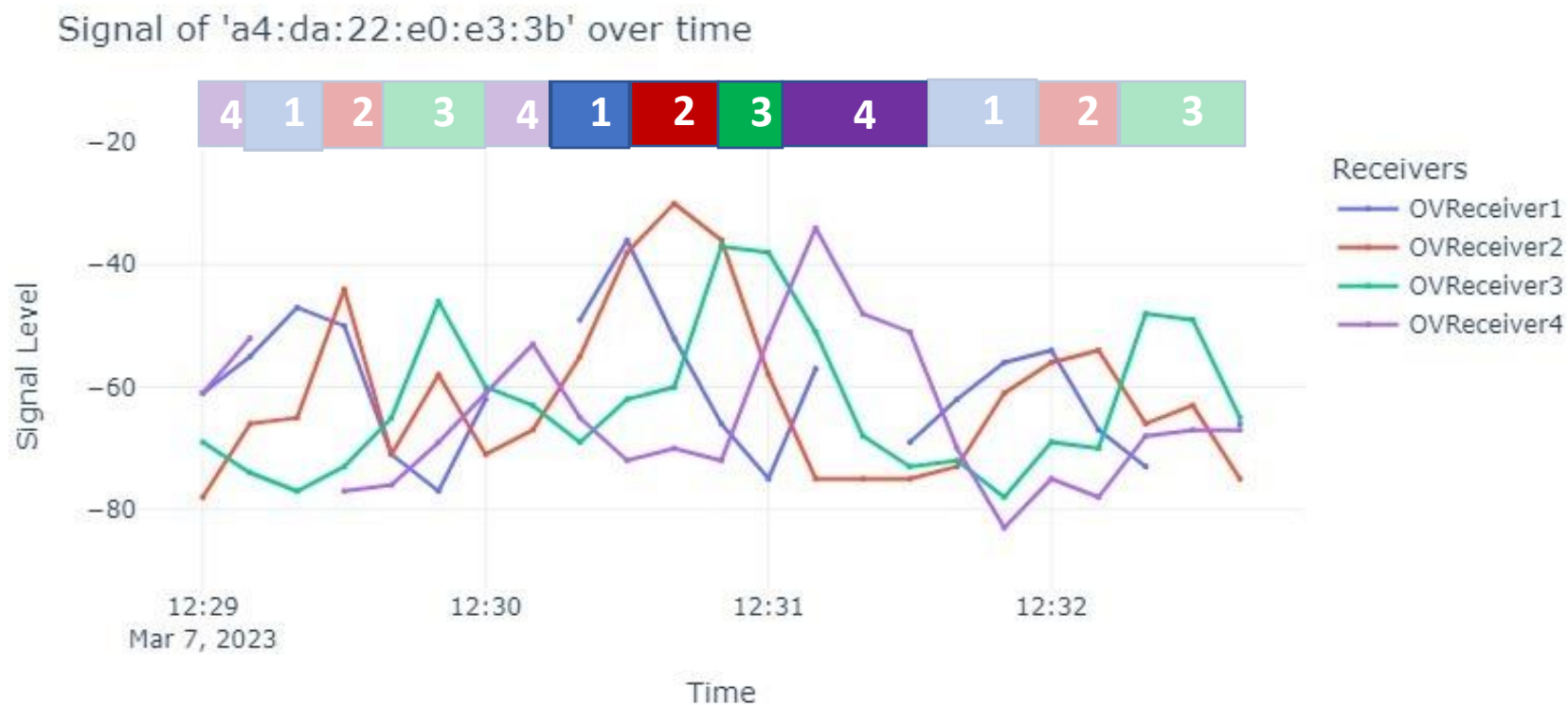
Signal of 'a4:da:22:e0:e3:3b' over time





# Test #1-7

- Worker is moving around the platform +1, 0, -1 **normal speed clockwise**  
**7.3.2023 12:29:00 – 12:32:45**

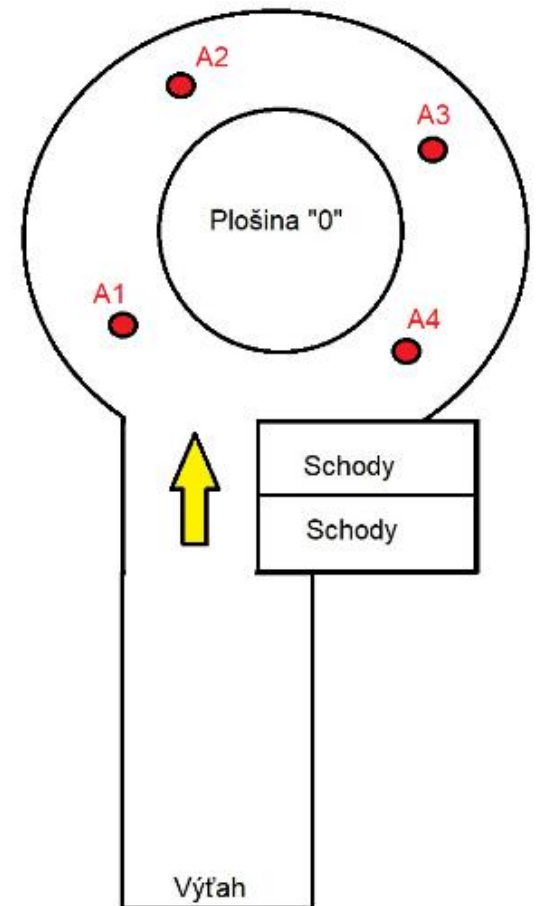
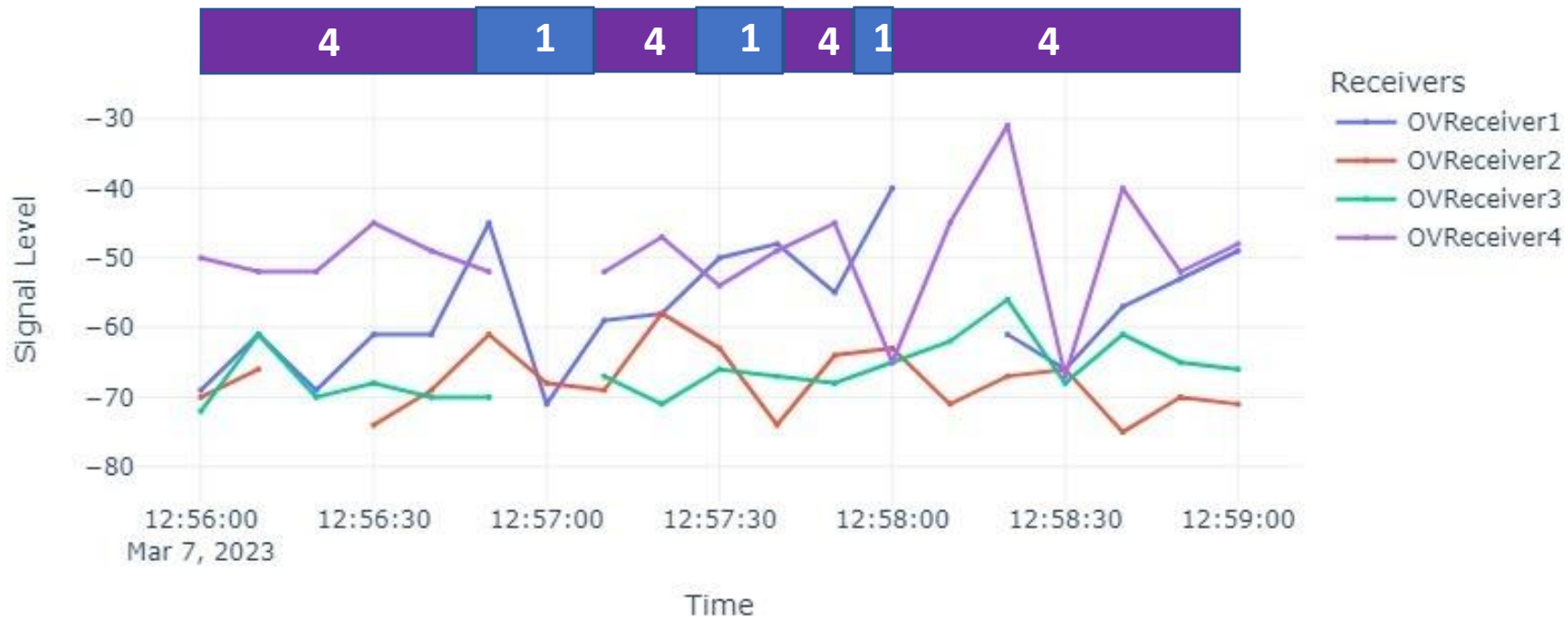


# Test #1-9

- Worker is moving around the stairs and moves at the platform **only within A1 and A4 sectors**

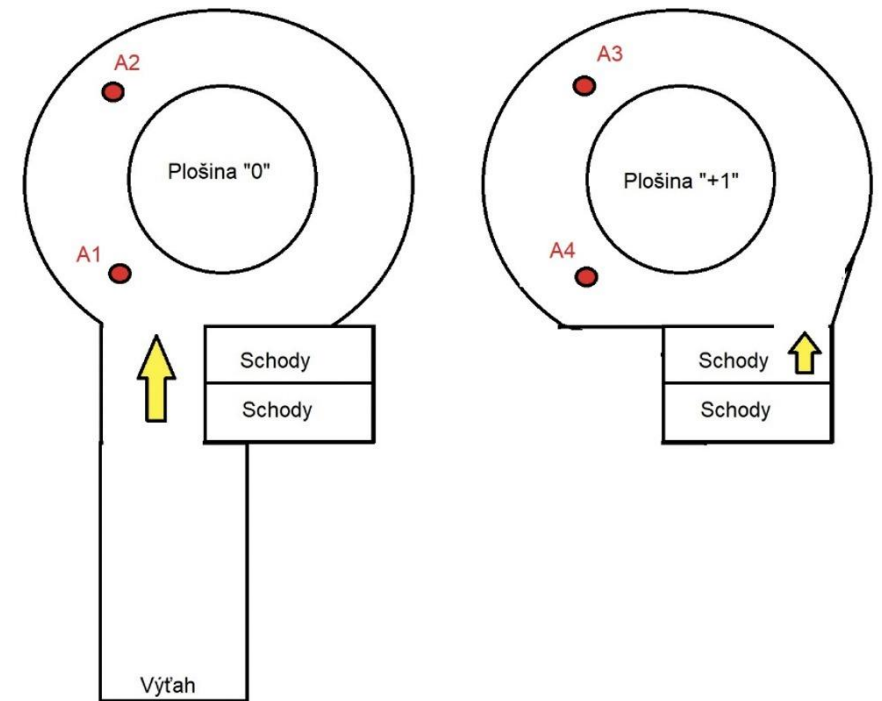
7.3.2023 12:56:00 – 12:59:20

Signal of 'a4:da:22:e0:e3:3b' over time



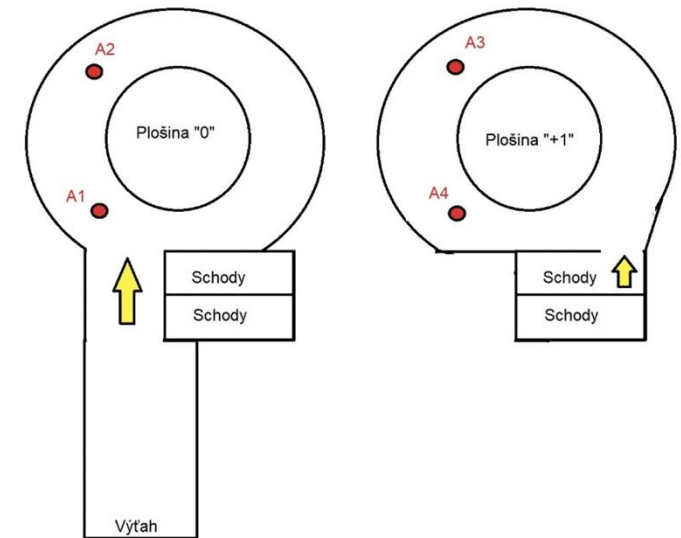
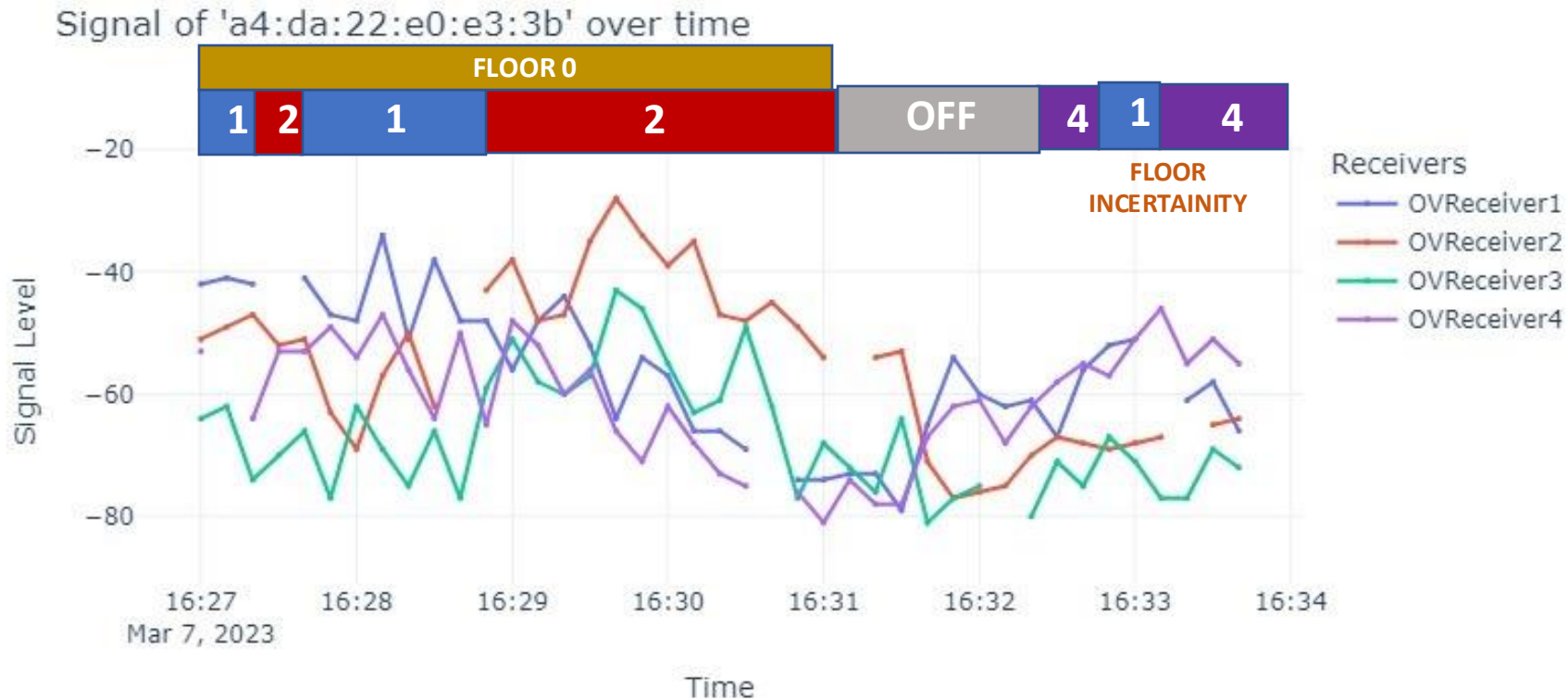
# Scenario overview – one platform

- Two platform above each other, 4 receiving antennas as illustrated
- **1 worker with tag moving in different ways**
- Positioning **accuracy to floor and sector (closest antenna, between antennas)**, provides real-time location updates for the moving object
- **Flexible solution** combining hardware components, Bluetooth Low Energy (BLE) devices and custom-made applications



# Test #3.2-3

- Worker is moving around the stairs and moves at the platform **only within floor 0**  
**7.3.2023 12:56:00 – 12:59:20**

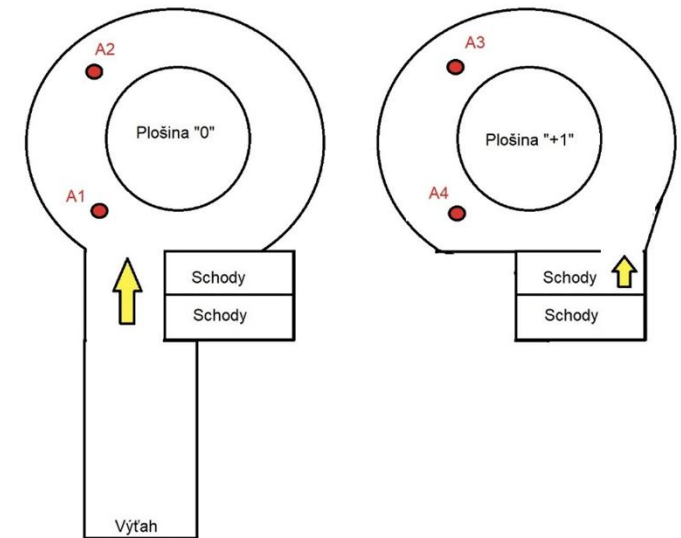
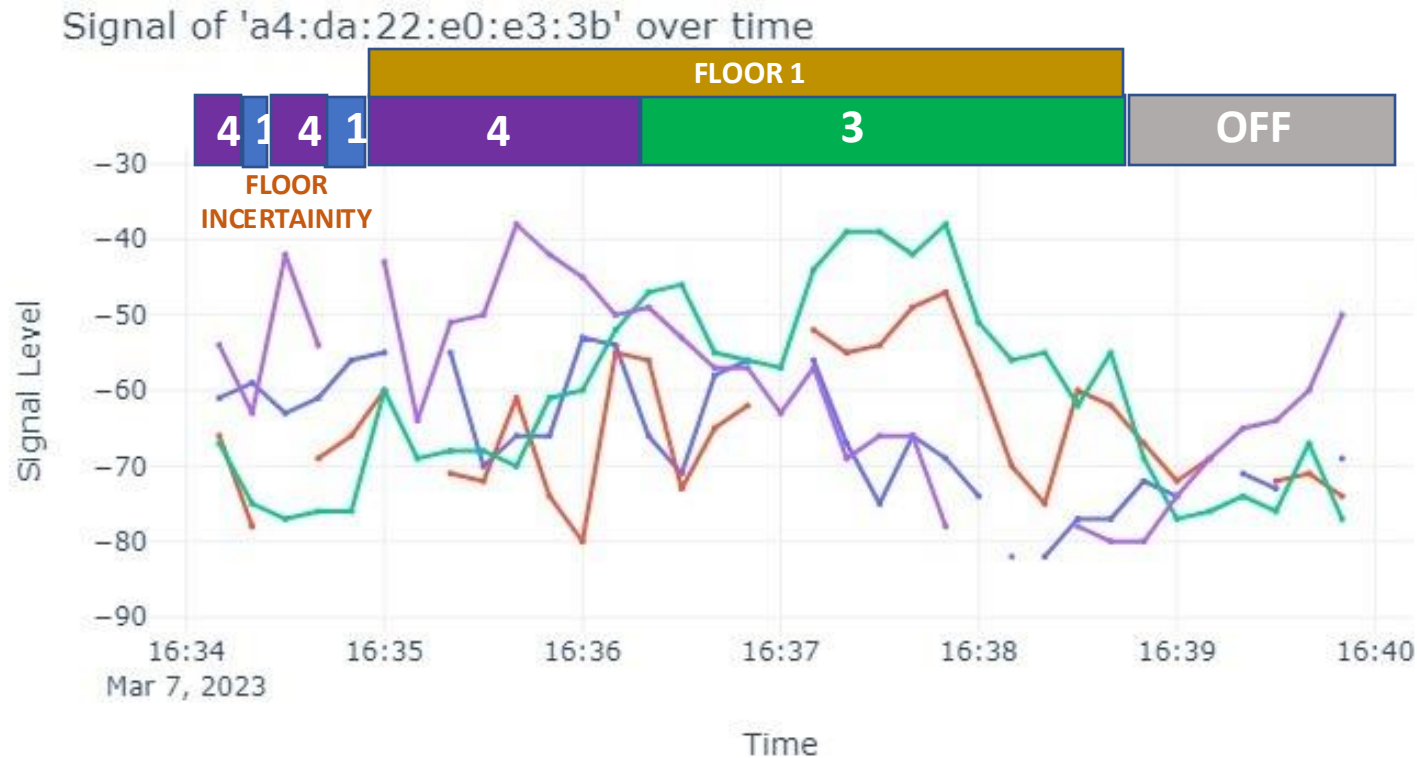


**We assume observed  
incertainty could be fixed by  
increasing antenna count**



# Test #3.2-4

- Worker is moving around the stairs and moves at the platform **only within floor +1**  
**7.3.2023 12:56:00 – 12:59:20**



# Conclusions

- Pilot prototype show potential of deployment BLE antennas **for floor and sector localization**
- Reliability still needs to be evaluated. Also, comparison with RFID card reader needs to be evaluated
- **System accuracy** is possible to improve by adding more receiver antennas to each platform of blast furnace construction

