

Project Presentation

Bjorn Jorissen

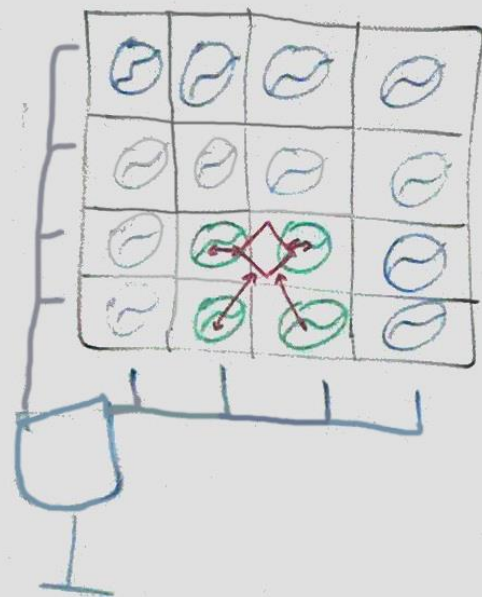
William Thenaers

Our Idea

- Game with complex rules → use technology
- Framework for boardgames with linear pathway
- Using RFID tags & LIDAR

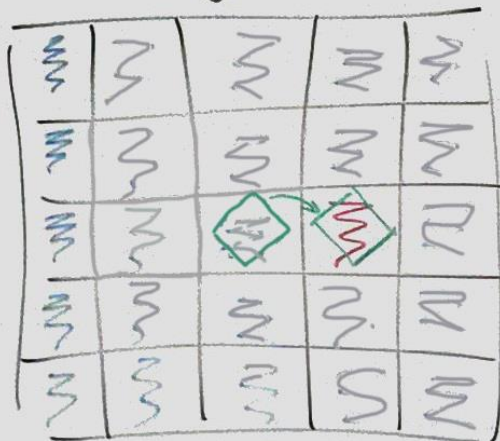
e.g. Monopoly

① Meerdere scanners



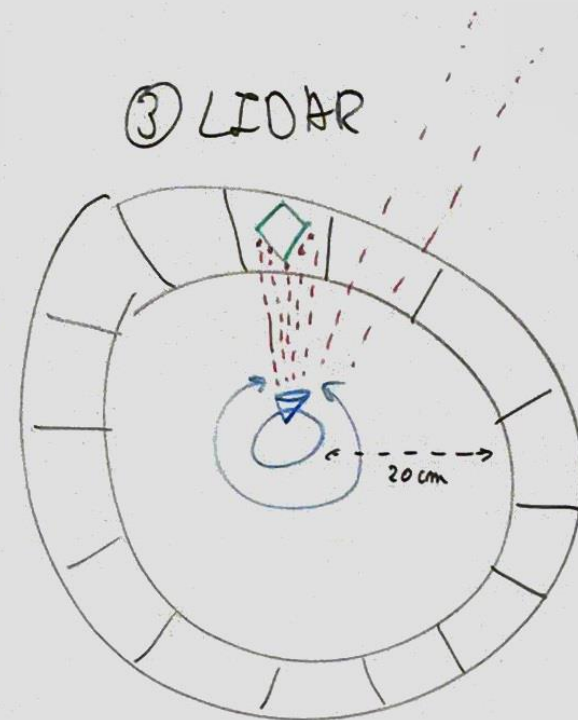
!!!

② Tags met 1 scanner



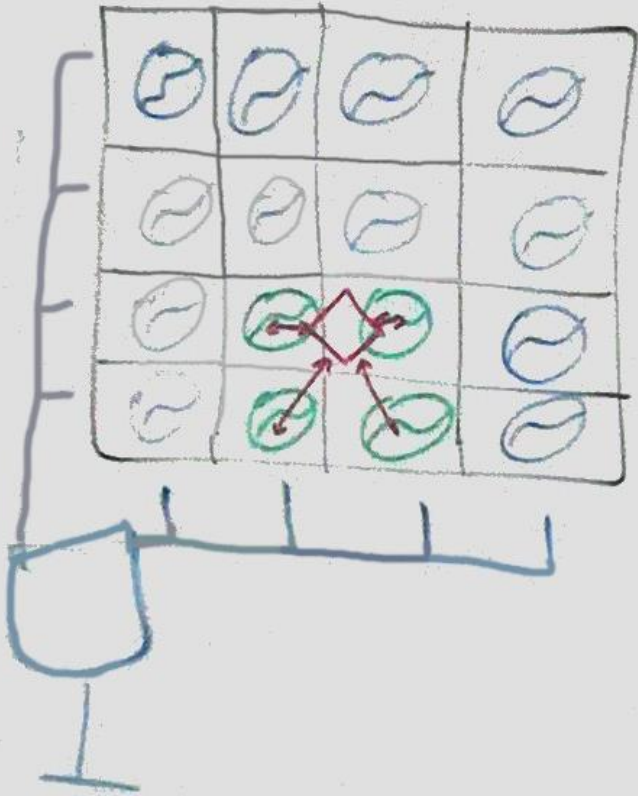
$5 + 3 = 2$ ☹️

③ LIDAR



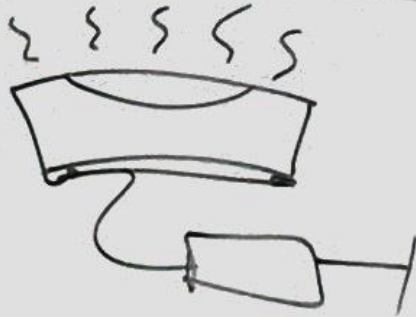
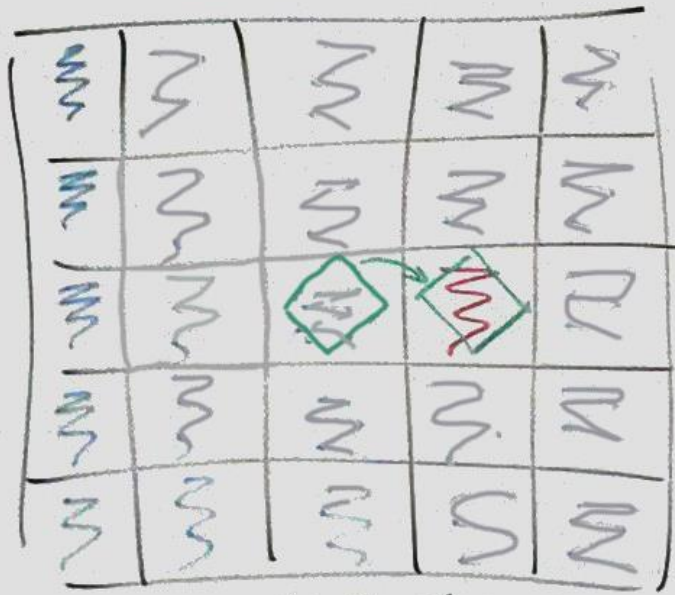
OK 😊
risk

1 Multiple scanners

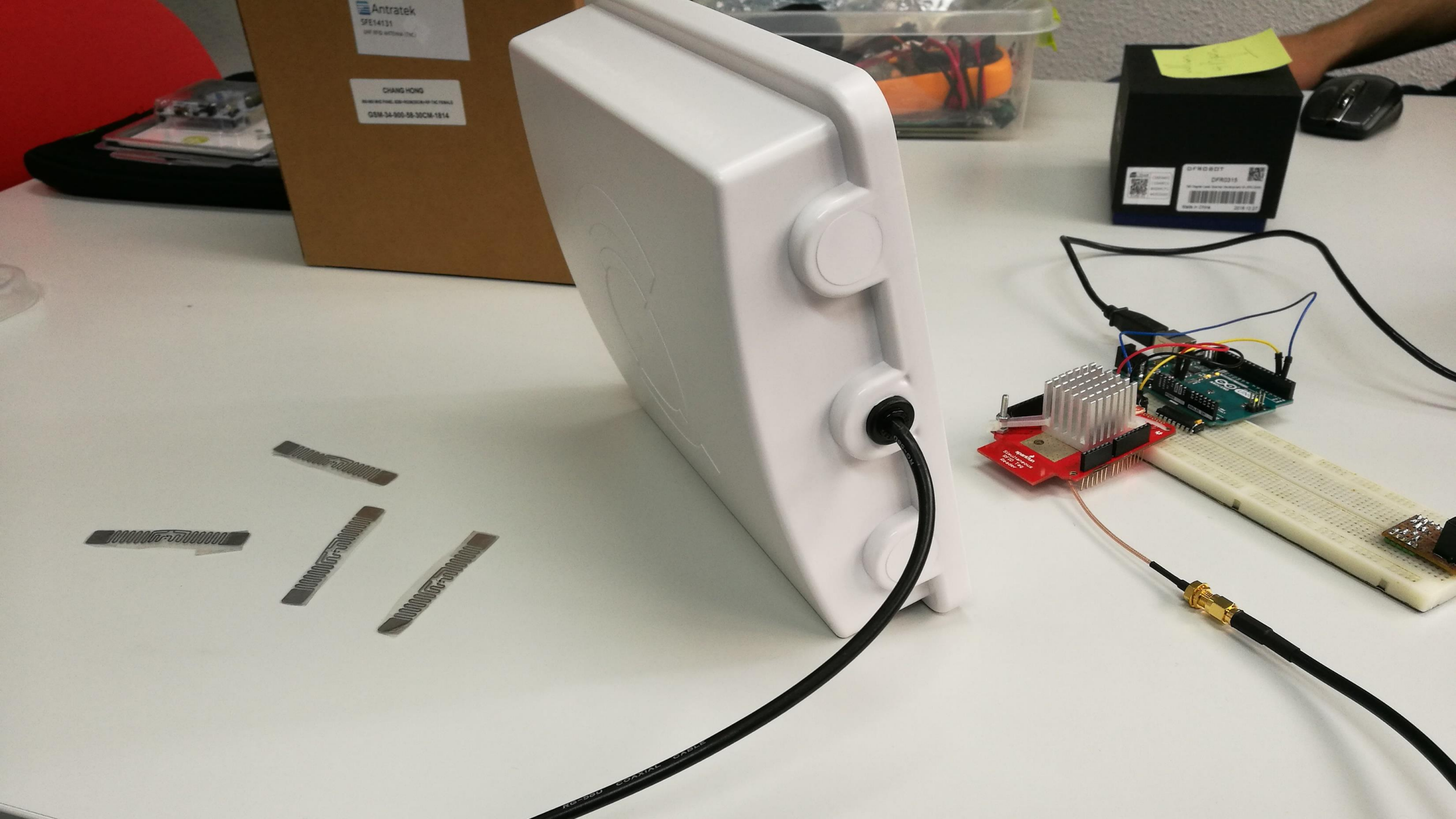


- Grid with RFID tag scanners
- Pawns have an RFID tag
- Too expensive
 - Every scanner → a MCU
 - Simultaneous RFID reader available

2 Multiple tags with one scanner



- RFID tag grid with signal blockers as pawns
- Test the available simultaneous RFID reader



Antratek
SFE14131
SMT SPS ANTENNA (TNC)

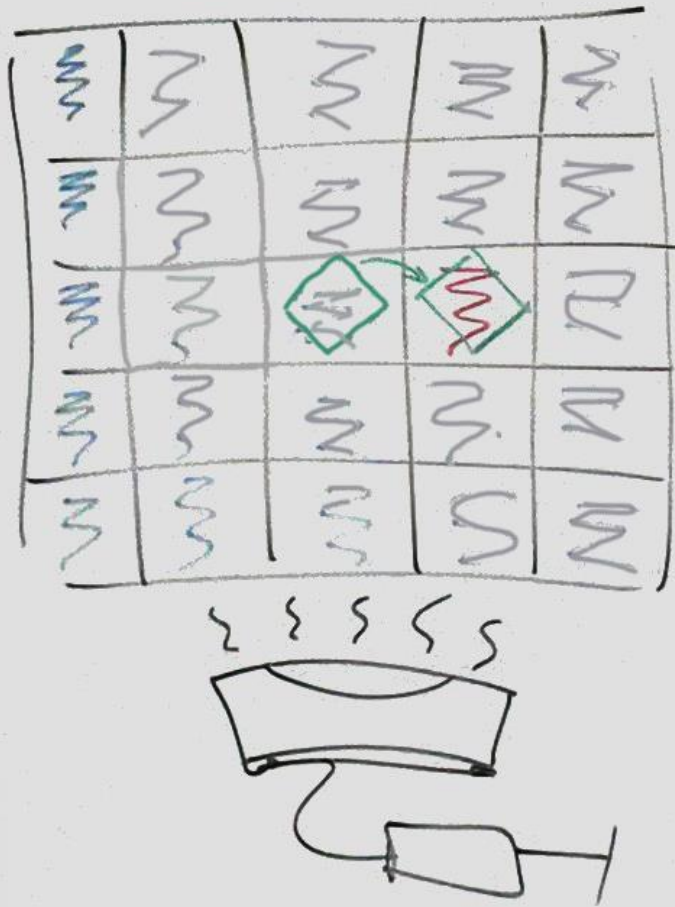
CHANG HONG
RESEARCH PANEL, GSM-RESEARCH-OF-THE-PANELS
GSM-34-900-58-30CM-1814

DFRobot
DFR0318
GSM-34-900-58-30CM-1814
Made in China

Scanning
Scanning
Scanning
Scanning
Scanning
Scanning
Scanning
Scanning
Scanning
Scanning
tag count: 4
Scanning
Scanning
Bad CRC
tag count: 3
Scanning

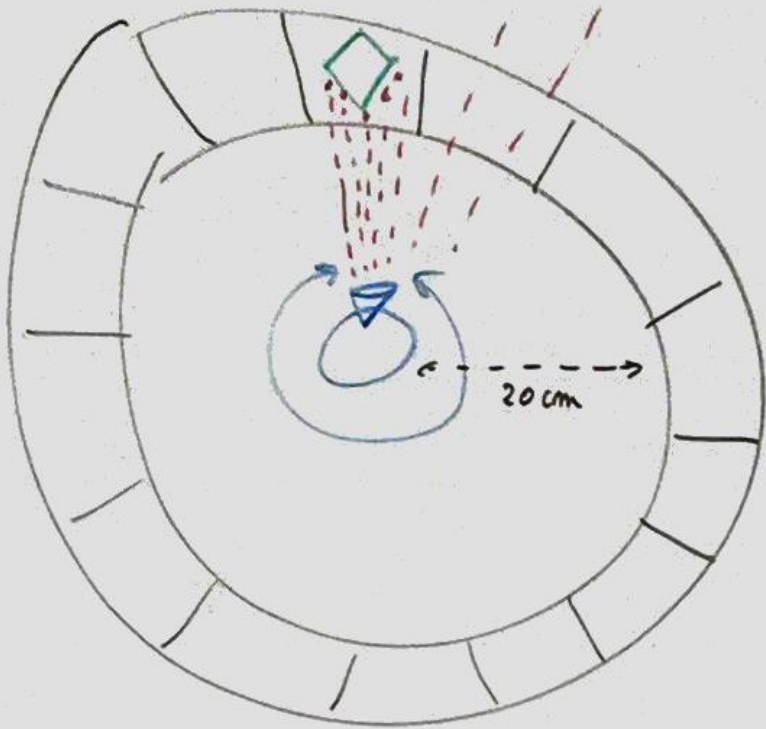


2 Multiple tags with one scanner



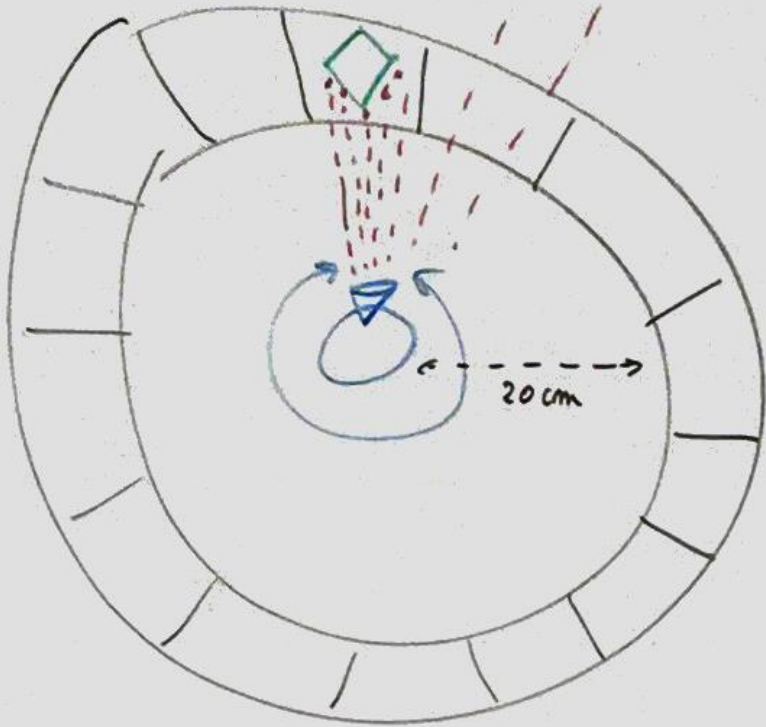
- Test the available simultaneous RFID reader
 - Way too unreliable for a simple setup
- Interference between UHF tags and receivers
- Power supply
- Code iterations
- In and out of range

3 LIDAR positioning



- LIDAR sensor detects if a pawn is within a certain region
- Only positioning available, no identification

3 LIDAR positioning

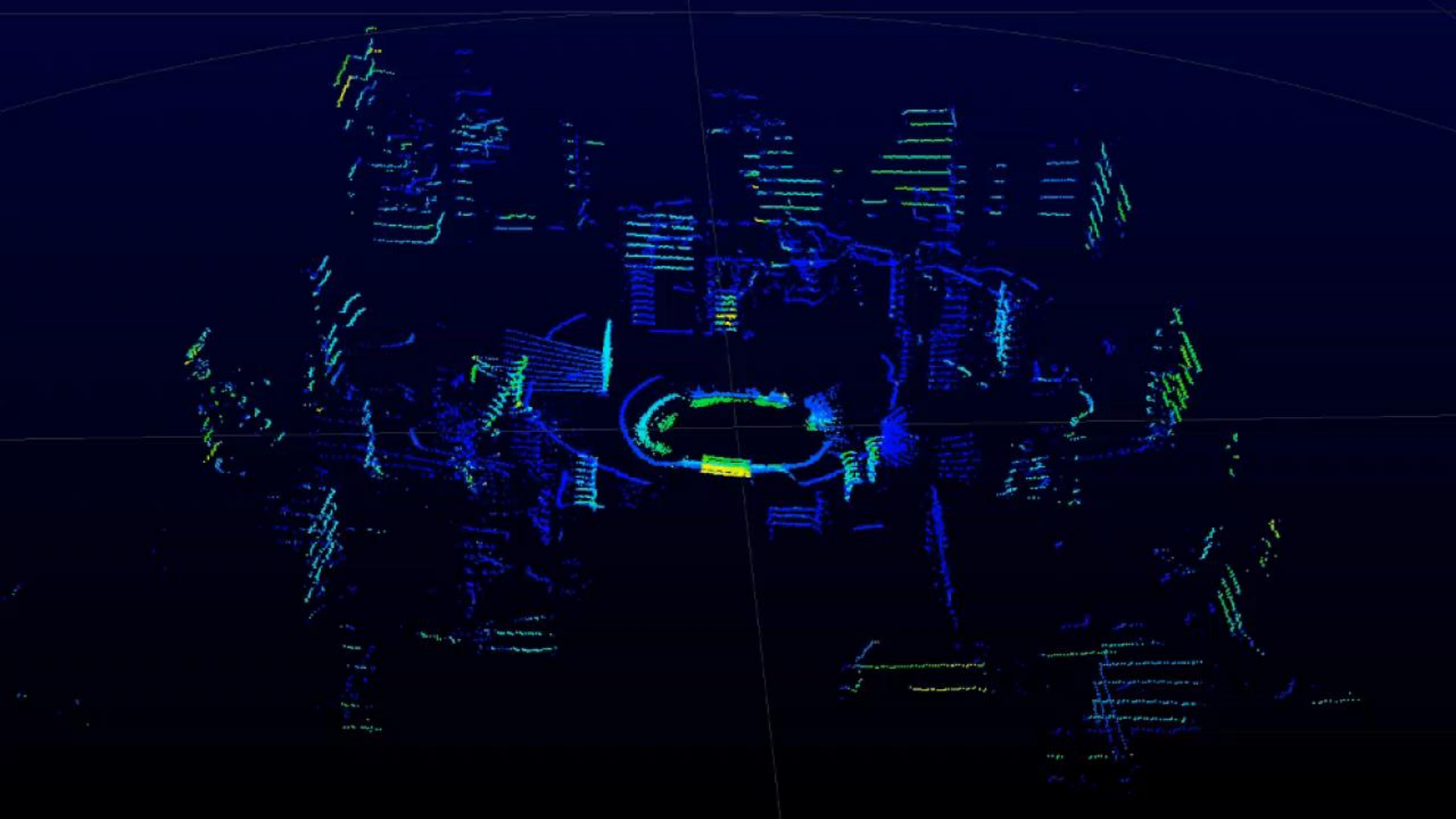


- Velodyne LIDAR
 - $1\text{ m} < \text{range} < 100\text{ m}$
 - Outdoors
- RPLIDAR
 - $20\text{ cm} > \text{range} > 6\text{ m}$
 - Indoors

Velodyne LIDAR



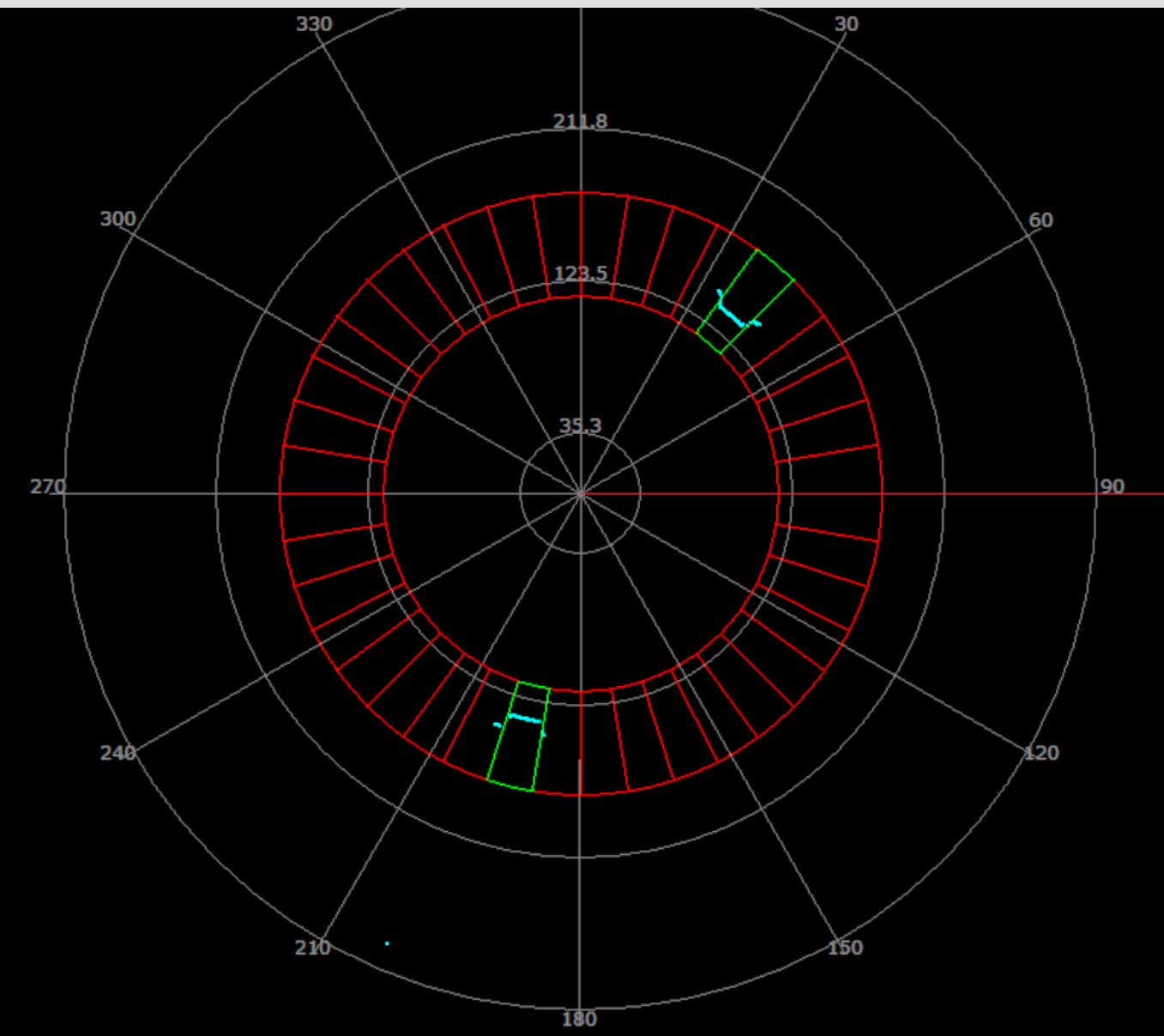
- Automobile industry
- Currently \$ 4,000
- $1\text{ m} < \text{range} < 100\text{ m}$
- Outdoors



Slamtec RPLIDAR A1



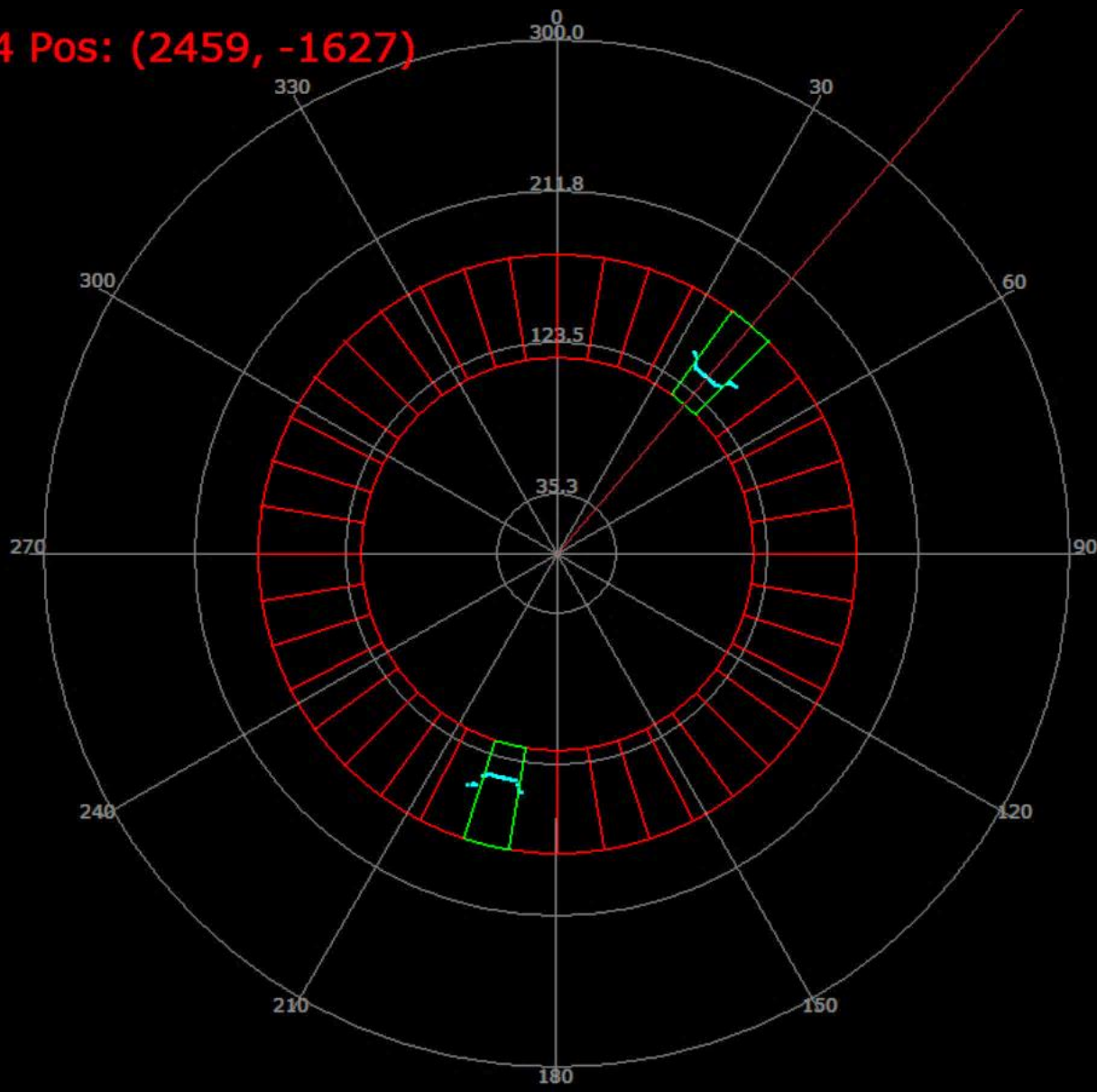
- Development kit
- Sells for € 100-150
- $20\text{ cm} < \text{range} < 6\text{ m}$
- Indoors



- Amount of cells
- Range of the cells
- Determine which cells are occupied and expose this info
- Minimum range
= 12 cm

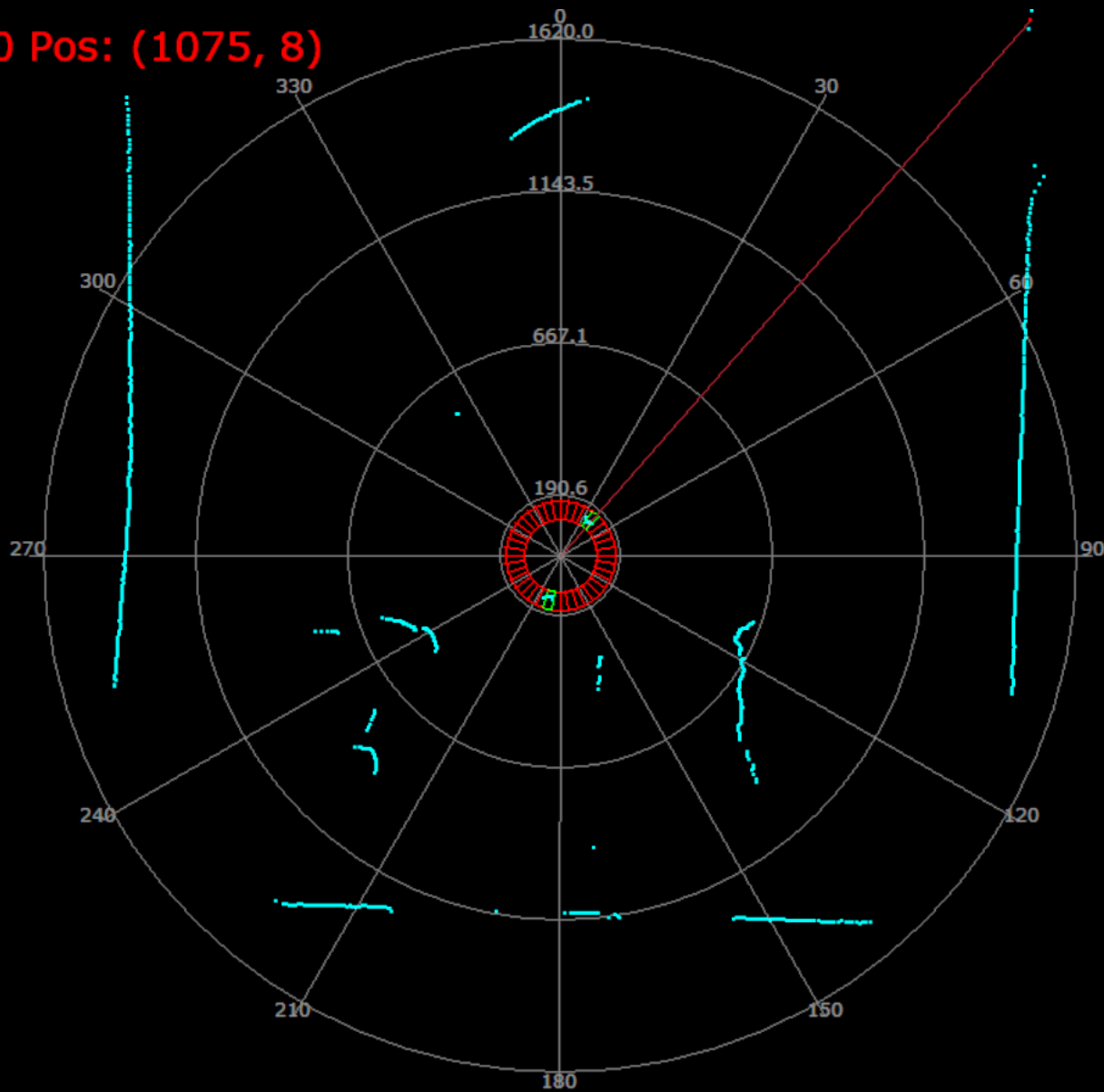
Current: 2304.00 Deg: 40.44 Pos: (2459, -1627)
7.3 Hz (436 RPM)

8 K



Current: 2232.00 Deg: 41.40 Pos: (1075, 8)
7.3 Hz (437 RPM)

8 K

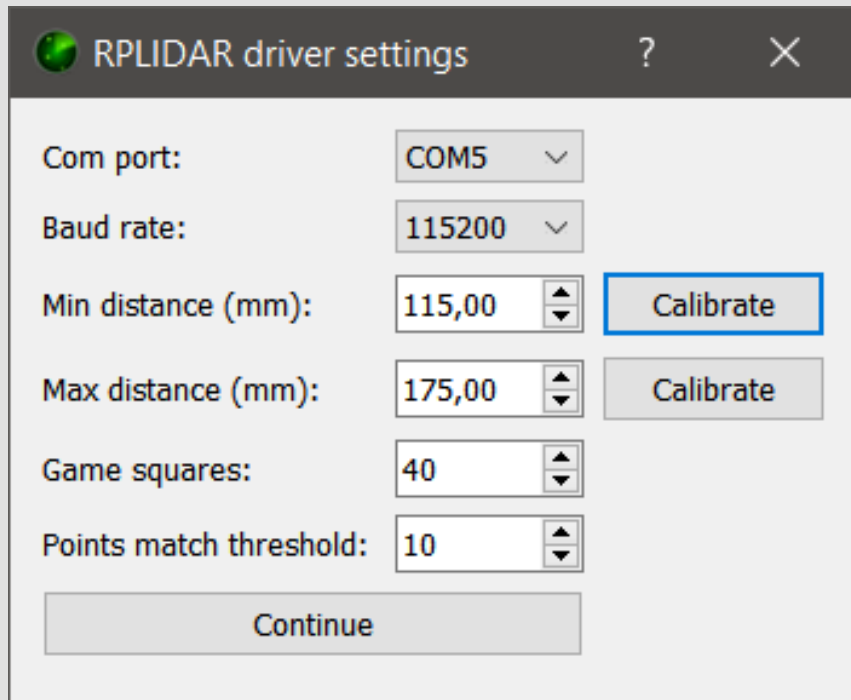


Application: simple Monopoly game



- Not feature complete
- Integration of LIDAR SDK with a Qt based game
- Some of our additions:
 - History
 - Visibility of pawns
 - Improvement in comfort
 - Visual changes
 - Pawn positioning with LIDAR

Game set-up LIDAR



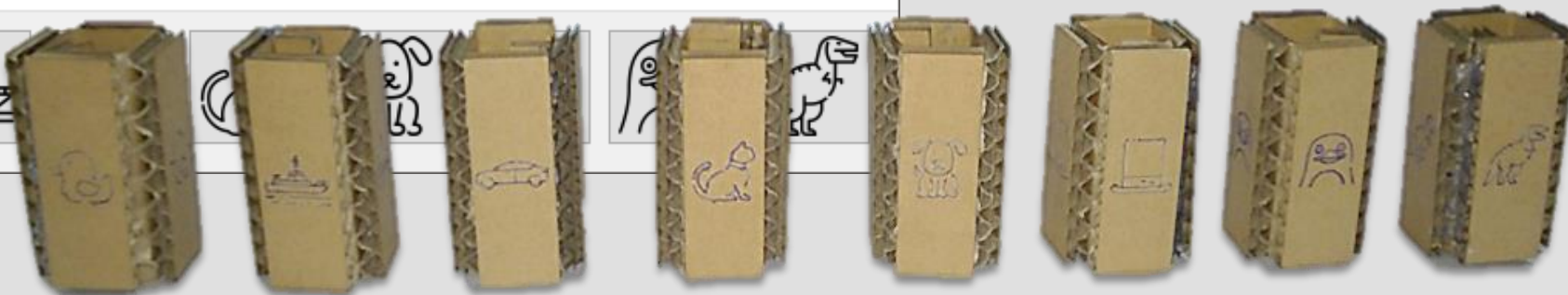
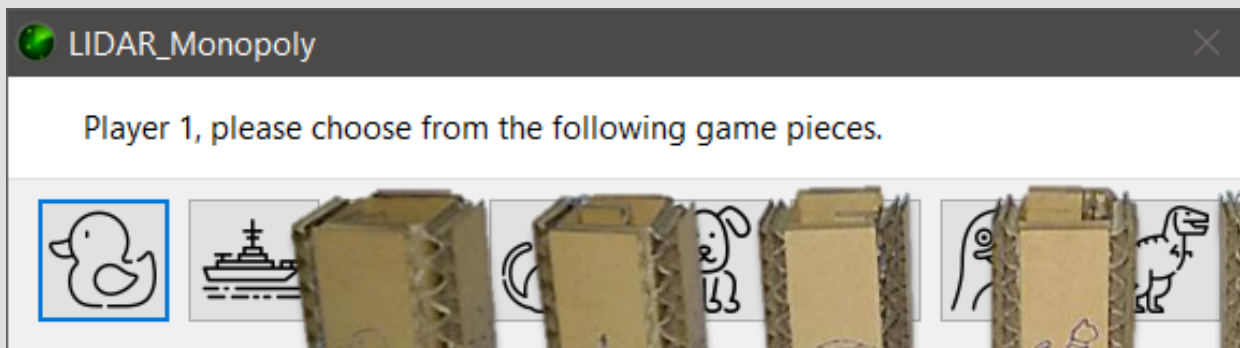
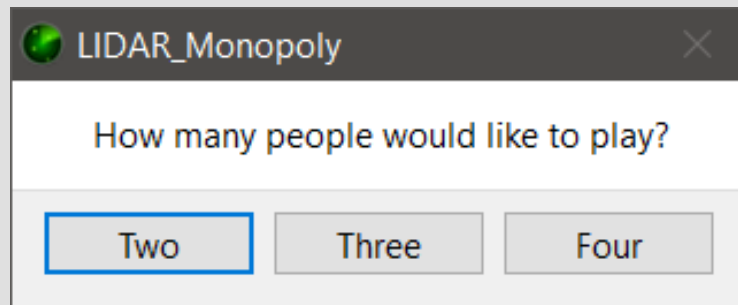
The screenshot shows a window titled "RPLIDAR driver settings" with a green sphere icon, a question mark, and a close button. The window contains several settings:

- Com port: COM5 (dropdown menu)
- Baud rate: 115200 (dropdown menu)
- Min distance (mm): 115,00 (spinner box) with a blue "Calibrate" button to its right.
- Max distance (mm): 175,00 (spinner box) with a grey "Calibrate" button to its right.
- Game squares: 40 (spinner box)
- Points match threshold: 10 (spinner box)
- A "Continue" button at the bottom.

- Adjust game settings regarding the board
- Calibration of detection range possible
- Board settings can be adjusted during the game


Game set-up Monopoly

- Choose amount of players
- Choose pawn for each player





History:

Player 1 

\$2500

Settings

Upgrade

Purchase

Rolled Dice and moved

See Player 1

See Player 2

See Player 3

See Player 4



Future work

- Multiplayer/remote play
- Make the framework easier to plug-in into an existing virtual game
- Other method of distinguishing between pawns
- More games