Indoor Positioning System Setup

Camera Specifications

A Basler camera is used for the indoor positioning system in the lab.

The system was originally intended to work in the infrared. The NIR sensor was selected for that reason. Due to eye safety concerns the system was switched to visible light.

The camera is mounted at a height of 3.3 meters to overlook the complete map area. It is centered to the map and orientated straight downwards. In order to simplify the positioning of the camera, we installed three aluminum profiles in an H-form to be able to move the camera along the x- and y-axis.

Model Number	acA2040-90umNIR
Camera Sensor Format	1"
Pixels (H x V)	2,048 x 2,048
Type	NIR Camera
Camera Family	ace
Conformity	USB3 Vision, GenICam
Dimensions (mm)	29.3 x 29.0 x 29.0
Exposure Control	Freely Programmable
Frame Rate (fps)	90
Imaging Device	CMOSIS CMV4000 NIR-enhanced
Input/Output Options	1 Opto-isolated Input/Output, 2 Fast-GPIO Ports
Manufacturer	Basler
Mount	C-Mount
Operating Temperature (°C)	0 to +60
Pixel Size, H x V (m)	5.5 x 5.5
Power Requirement	Via USB 3.0 interface
Synchronization	Via External Trigger, or Free-Run
Type of Sensor	Progressive Scan CMOS
Type of Shutter	Global
Video Output	USB 3.0

Calibration

A PVC canvas of the size 4.0 x 4.5 m with a 0.1 x 0.1 m checkerboard pattern printed on it is used to calibrate the IPS. This pattern is also used to define the coordinate system in the lab.

Compile and test

```
cd ~/dev
git clone https://git.rwth-aachen.de/CPM/Project/Lab/software.git
cd software
cd ips2
./build.bash
```

To test that the IPS works, open two terminals. In the first, run

```
./build/BaslerLedDetection --visualization=true
```

Switch a vehicle on and place it in front of the camera. The flashing LEDs should be highlighted in the visualization.

In the second terminal, run

```
./build/ips_pipeline --visualization=true
```

The detected LEDs sould also show up in this second visualization.