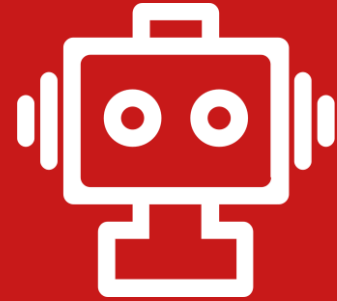# Initial Design

Embedded Motion Control [4SC020]

Group 9

Introduction

- PICO robot
- Escape Room Challenge
- Hospital Challenge

TU/e

Requirements

General	Escape room	Hospital
Operate autonomously	Detect walls and exit	Map room
No bumps	Time < 5 minutes	Avoid obstacles
Standstill time < 30 seconds	Rear wheels pass finish line	Detect moving objects
Software easy set-up	Stop after crossing finish line	
Avoid deadlocks or infinite executions		
Operate as quick as possible		

TU/e

Functions

Low-level	Mid-level	High-level
Move in certain direction	Path following	Initialization & shutdown
Rotate	Move parallel to wall	Identify position
Obtain laser data	Avoid obstacles	Path planning
Obtain encoder data	Identify exit and walls	Mapping
Track control effort	Track closest distance to wall	Mediation
	Compare sensor and control data	Monitor progress
		Filter data

TU/e

Components

Platform:

- **PICO:**
  - **Height: 100.5 cm**
  - **Width: 41 cm**
  - **Depth: 35 cm**

Computer:

- **Ubuntu 16.04**
- **Intel i7**

Actuators:

- **Holonomic base with 3 omni-wheels**
- **Pan-tilt unit for head**

Sensors:

- **Laser Range Finder (LRF)**
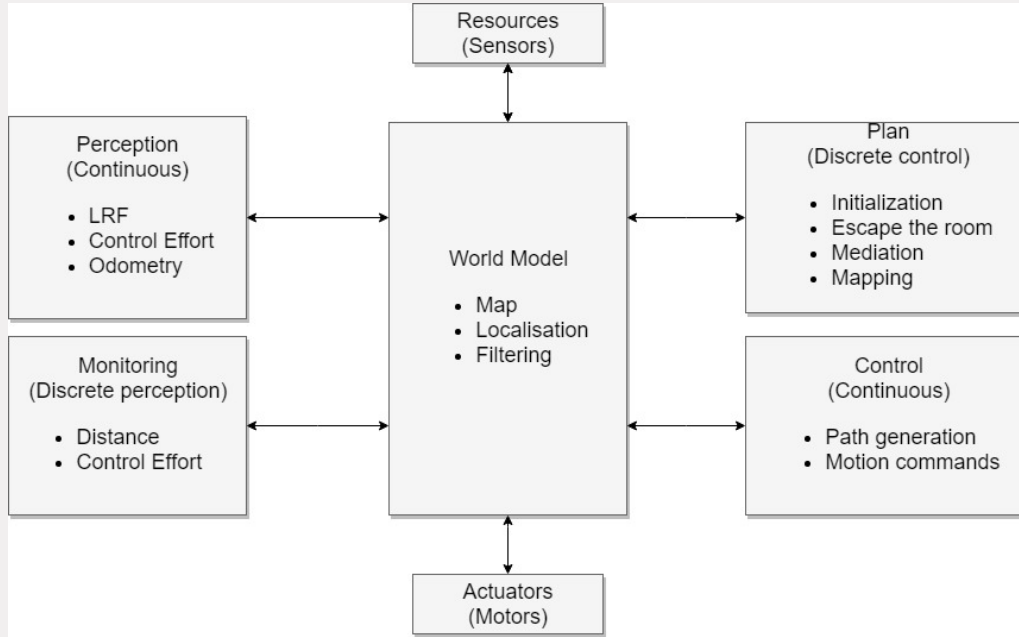- **Wheel encoders**

TU/e

Specifications

PICO:

- **Maximal translational velocity (0.5 m/s)**
- **Maximal rotational velocity (1.2 rad/s)**
- **Field of view of LRF (-2 to 2 rad)**
- **Range and resolution LRF**

Room:

- **Rectangular**
- **Corridor width (0.5 – 1.5 m)**
- **Finish line after 3 m**

Interfaces

Questions?