Starting date: March 27th, 2017   **Presentation**: May 22nd

Project check dates: April 24th, May 8th

Project technical support: April 20th, May 4th

Goal: to propose, implement and test a high-level controller for controlling the TurtleBot in a simulated environment with fixed. The application consists in exploring as much area of the unknown map as possible.

The robot has to exhibit two tasks:

1. The first one is for exploring the environment until a certain time has happened.

2. The second one consists in returning to the starting position using the obtained map.

Both tasks must be accomplished and it is important to exhibit as more intelligent and robust behaviour as possible.

Contents of the architecture:

- Octomap representation
- OMPL-based path planning
- Exploration behaviours: random, predefined, online, path planning till new free directions, …
- Reactive behaviours for mobile obstacles: stop, avoid, …

Platform: TurtleBot in simulation
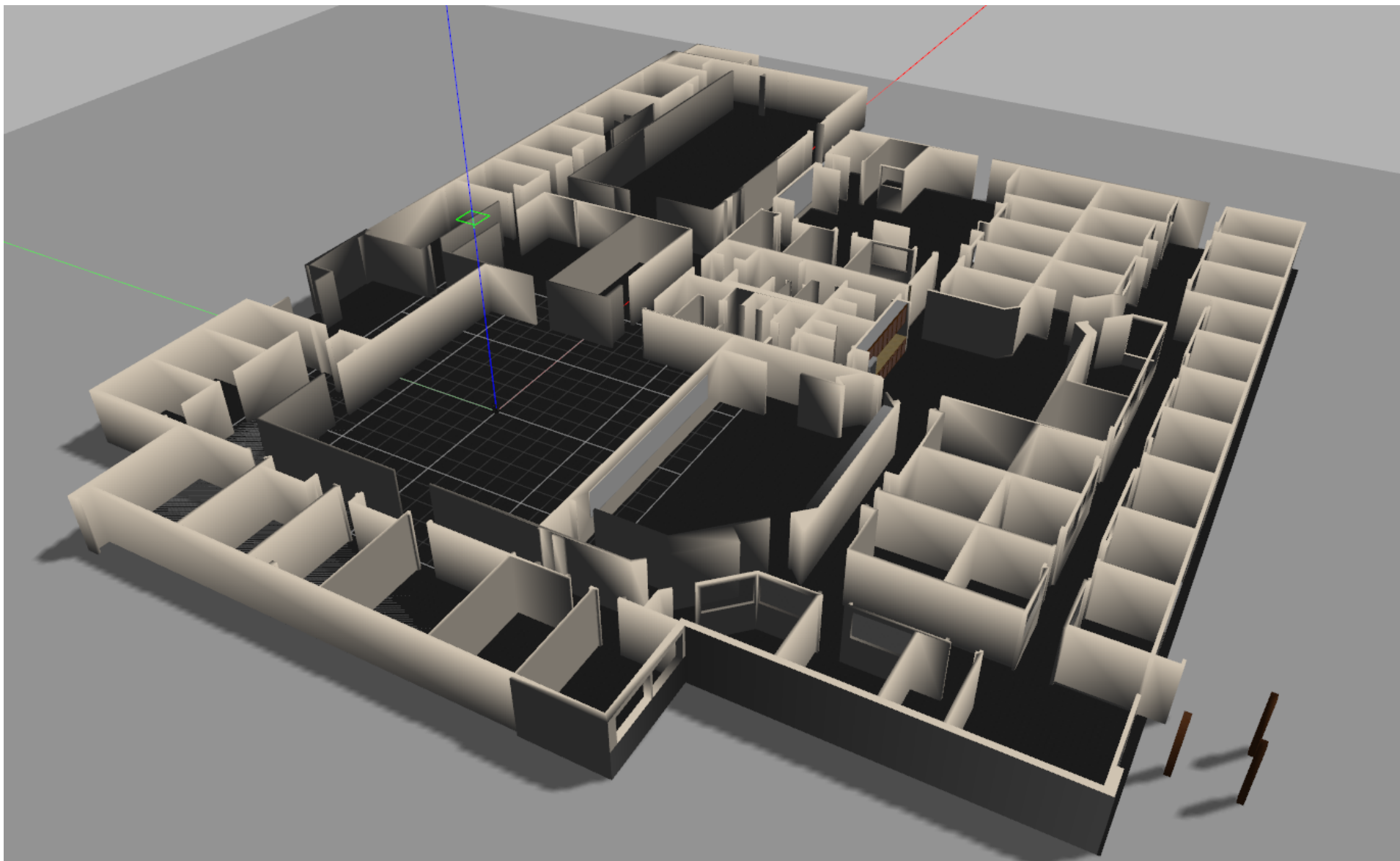
Software: ROS software

Simulation: Gazebo with the proposed environment

Teams: 2/3 students

Final deliveries: Presentation (7') + video (3') + demo (5') + report + code

Video contents: Title with authors, explanatory text, simulation, real execution, RViz, maximum 3 minutes.

Report: 4 to 6 pages report following the IEEE template.

Autonomous Robots

Project

	THEORY			PRACTICE (LABORATORY)	
Week	Date	Contents	Date		Contents
1	06/02/17	Introduction and BBR	09/02/17		
2	13/02/17	Bug algorithms / Q space / Potential functions	16/02/17		P1 - Potential functions
3	20/02/17	Sampling-based algorithms	23/02/17		
4	27/02/17	Sampling with constraints (JDH)	02/03/17		P2 - Sampling-based algorithms
5	06/03/17	Bug Tangent + Topological maps	09/03/17		
6	13/03/17	Topological maps	16/03/17		P3: Mapping and planning with Turtlebot
7	20/03/17	Graph Search	23/03/17		P3: Mapping and planning with Turtlebot
8	27/03/17	Cell decomposition and Project proposal	30/03/17		P4 - Topological maps
9	03/04/17		06/04/17		P3: Mapping and planning with Turtlebot
10	10/04/17	EASTER HOLIDAYS	13/04/17		EASTER HOLIDAYS
11	17/04/17	EASTER HOLIDAYS	20/04/17		Project preparation with Turtlebot
12	24/04/17	Project revision	27/04/17		P5 - Graph search
13	01/05/17	HOLIDAY	04/05/17		Project preparation with Turtlebot
14	08/05/17	Project revision	11/05/17		
15	16/05/17		18/05/17		
16	22/05/17	Project presentation	25/05/17		
17	29/05/17	EXAM Weeks	01/06/17		EXAM Weeks
18	05/06/17		08/06/17		