Requirements Document

Project: Liberty

Task: Capturing

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2.0 CAPABILITIES

2.1 PURPOSE

Design and implement an autonomous flag capturing system that is able to meet the following requirements:

- Drive to the blocks at defined speed. [*REQ - CPT-2.1.1*]
- Seek the specific coloured block. [*REQ - CPT-2.1.2*]
- When meet an obstacle (i.e. blocks of other colour or other robots), avoid it. [*REQ - CPT-2.1.3*]
- Indicate the status of the flag capturing system as on or off. [*REQ - CPT-2.1.4*]
- Beep for three times after detecting the flag get to capture it.. [*REQ - CPT-2.1.5*]

2.2 SCOPE

For the Capturing system to perform as designed, the ranges of the condition it
 operates in are as following:

- The operating range of the robot is required. [*REQ - CPT-2.2.1*]
- The operating speed of the robot must be defined. [*REQ - CPT-2.2.2*]
- The direction and the distance of the nearest block should be given from the sensors. [*REQ - CPT-2.2.3*]
- The colour of the starting zone and the target colour are required. [*REQ - CPT-2.2.4*]
- The colours of the blocks are needed. [*REQ - CPT-2.2.5*]

2.3 CONSTRAINTS

There are certain constraints during the process of designing and implementing the flag capturing system.

REQ - CPT - 2.3.1: Taken from the **Project Specification (v 1.2F):** "The opponent's flag cannot be moved more than a linear distance corresponding to the side of one square".

Hardware: See *CON - GEN; 3* for Hardware constraints

Software: See *CON - GEN; 4* for Software constraints.

Resources: See *CON - GEN; 6* for Budget constraints.

2.4 USER FUNCTION

The starting zone and the targeted colour should be given at the beginning of the round through the wifi communications. The colour is derived from a colored spot on the map, which is made by the user.

2.5   OPERATING ENVIRONMENT

See *REQ - GEN;* **2.2.1** for the dimensions of the playing field

2.6 PERFORMANCE

3. COMPATIBILITY

3.1 COMPONENT RE-USED

Previous implementations of this subsystem have not been created and will need to undergo research and development.

3.2 COMPATIBILITY WITH THIRD PARTY PRODUCTS

According to the **Project Description (v 1.2F)** provided by the client and *CON - GEN; 3.2* we are provided access to a 3D printer. There are no third party products required for this system regarding both software and hardware.

4. GLOSSARY OF TERMS

1. <u>Odometer</u> refers to a program to compute and update the value of x, y coordinates and the heading of the robot
2. <u>Navigation program</u> refers to a program that drives between 2 points
3. <u>Odometer Display</u> refers to a program that visualize the positioning information of the robot