

# Test Document

## Project: LIBERTY

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# McGill

# TABLE OF CONTENTS

<b>TABLE OF CONTENTS</b>	<b>2</b>
<b>TESTS:</b>	<b>3</b>
1.1 Navigation corner zero test	3
<b>2. Hardware used</b>	<b>6</b>

# 1.0 TESTS:

## 1.1 Navigation corner zero test

### Test 1: Navigation to zipline test

Date: 12/11/2017

Tester: Edward Son

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- 1) This test will validate the functionality of navigation, in that it successfully navigates to the point desired starting in corner zero.
- 2) This test should make the robot drive to the coordinates of the zipline given over wifi, and turn to the true zero degree angle.
- 3) The brick should be positioned near corner 0 on the point (1,1). The point should be in the center of the wheel base, with the angle facing exactly 0 degrees. The robot receives data over wifi, more specifically the ZO\_G\_x and ZO\_G\_y which corresponds to the tile in front of the zipline. Once data is acquired, the command “start” is used on the server GUI and the robot starts navigation. Once the robot stops moving, one must measure the x and y offset of the final position, and the angle error compared to the initial zero degrees.
- 4) The brick should end up at the point (5,2) with an angle close to true zero degrees.
- 5)

Test run #	Starting Position	Final X error (cm)	Final Y error (cm)	Starting X error (cm)	Starting Y error (cm)
1	(1,1)	0	3.5	0	0
2	(1,1)	0.5	2	0	0
3	(1,1)	-1	7	0	0
4	(1,1)	0	5	0	0
5	(1,1)	0.3	4	0	0
6	(1,1)	-0.5	0.8	0	0
7	(1,1)	-1.5	3	0	0

8	(1,1)	1	2.5	0	0
9	(1,1)	-1.2	3	0	0
10	(1,1)	-0.8	0	0	0

**Figure 1: Final X and Y distance error**

Test run #	Error distance (cm)
1	3.5
2	2.1
3	7.1
4	5.0
5	4.0
6	0.9
7	3.4
8	2.7
9	3.2
10	0.8

**Figure 2: Error distance for each run**

Standard Deviation	Mean(cm)
1.9	3.3

**Figure 3: Standard deviation and mean of error distance**

Test Run #	Angle error (degrees)
1	0
2	2.4

3	-1.7
4	-2
5	1
6	1
7	-1.5
8	0
9	-1
10	1

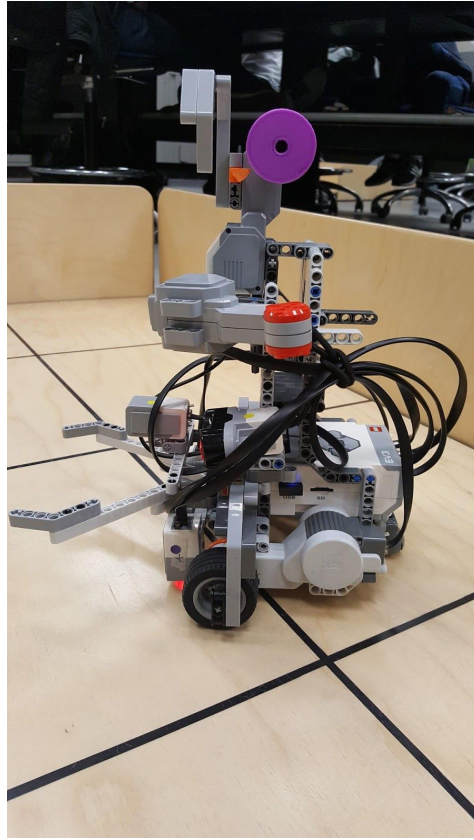
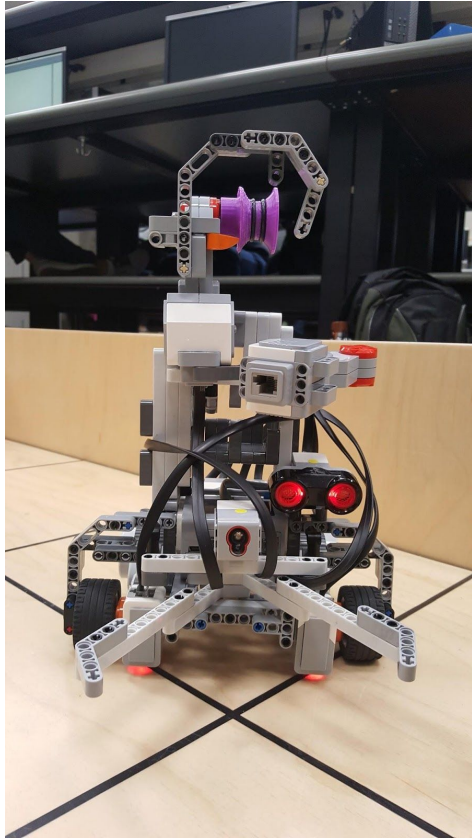
**Figure 4: Final angle error compared to true 0 degrees**

<b>Standard Deviation</b>	<b>Mean(cm)</b>
1.4	-0.1

**Figure 5: Standard deviation and mean of angle error**

- 6) The brick successfully successfully reaches the end point, with a standard deviation of 1.9 for the distance error, and a standard deviation of 1.4 for the angle error. This is satisfactory, as there will also be correction implemented to reduce this error.
- 7) Navigation starting from corner 0 is satisfactory and can be used in the final demo.

## 2. HARDWARE



See *HARDWARE - 2.0*.