

# HARDWARE VERSION 1.5 LOCALIZATION TIMING TEST

GROUP 4

1st December 2016  
Version 2

## Abstract

After multiple tests using a standard robot design, we found out that bumper-based localization worked best. Contrary to expectations, when using Hardware Version 1.5, the robot did not localize properly due to the balance of the design causing the wheels to lose traction and slip excessively during turns.

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## 1 BACKGROUND

### 1.1 Edit History

Jake Zhu: 2016-10-28, Initial set up

**Mamoun Benchekroun, Richie Piyasirisilp:** 2016-11-10, Added Abstract Section

**Jake Zhu:** 2016-11-10, Wrote up the document based on the information from the Software Team.

**Benjamin Willms:** 2016-11-13, Edited the wording and grammar of the various sections of the document, and changed the title to better reflect the test done.

## 1.2 Test Information

**Tester:** Alexis and Tristan

**Author:** Jake, Mamoun, Richie and Ben

**Hardware Version:** Hardware Version 1.5

**Software Version:** BumperLocalization.java 2af0824

**Goal:** Evaluate the reliability and speed of the bumper localization method at various initial positions and angles within a corner square.

## 2 PROCEDURE

**Setup:**

1. Place the grabbing mechanism at the proper height to act as a bumper for localization
2. Run BumperLocalization.java

**Test:**

1. Start the code and a timer simultaneously.
2. The robot will turn 360 degrees.
3. It will find the closest point, which should be the closest wall.
4. The robot will back up into the wall causing it to go to zero degrees, also capturing a coordinate value.
5. The robot will drive forward, make a 90 degree turn, and repeat step 3.
6. The robot is now localized.
7. End the timer.

### 3 EXPECTED RESULT

We have tried this algorithm using a smaller robot, and it was working perfectly. We believe the balance may affect the localization, because it causes the robot to lean back, away from the wheels, but it should be able to finish successfully.

### 4 TEST REPORT

Trial	Time
1	Did not finish
2	Did not finish
3	Did not finish
4	Did not finish
5	Did not finish
6	Did not finish
7	Did not finish
8	Did not finish
9	Did not finish
10	Did not finish

The localization with this hardware and software version was unsuccessful.

### 5 CONCLUSION

The robot would spin 200 degrees instead of the necessary 360 degrees, which means that the whole process, based of the initial 360 degree turn, could not be completed. It seems that the robot has balance issues which caused the wheels to slip. This also means that navigation and odometry will not work properly with this hardware version.

### 6 ACTION

This report will be sent back to the Hardware Team so they can design a more balanced robot.

### 7 DISTRIBUTION

Hardware Team