# Test Plan

The test plan outlines the processes in which team AWTY? will take in order to test Roadie for the completion of the requirements set by team AWTY? to compete in the IEEE 2015 Southeast Competition.

## Coordination Test Cases

The following test cases in **Table 1**, **Table 2**, **Table 3**, **Table 4**, and **Table 5** test the coordination system of Roadie. **Table 1** tests Roadie’s ability to detect and identify an object in front of Roadie when reaching a challenge zone. **Table 2** tests Roadie’s ability to identify the Rubik’s Cube used in the IEEE competition and Roadie’s ability to align to the Rubik’s Cube. **Table 3** tests Roadie’s ability to identify Simon Carabiner and align to Simon Carabiner. **Table 4** tests Roadie’s ability to identify the Etch-A-Sketch and align to the Etch-A-Sketch. **Table 5** tests Roadie’s ability to identify the Playing Card Deck and align to the Playing Card Deck.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Coordination-1 | |  |  | **Test Design By:** Michael Philotoff | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** November 30, 2014 | | |
| **Module Name:** Coordination | |  |  | **Test Executed By:** | | |
| **Test Title:** Identify challenge in 10 seconds | | |  | **Test Execution Date:** | | |
| **Description:** Identify a challenge once arriving to that challenge zone within 10 seconds | | | |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie arrives at a challenge zone | | |  |  |  |  |
| **Requirement Satisfied:** COR 6 and COR 6.1 | | |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| 1 | Turn on the ultra-sonic |  | Ultra-sonic operational |  |  |  |
| 2 | Detect an object within 4 inches of Roadie | Object Detected | Detects an object |  |  |  |
| 3 | Turns the camera on |  | Camera is operational |  |  |  |
| 4 | Camera identifies the challenge within 5 seconds | Object Identification | Camera identifies the object |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Identifies the challenge present in front of Roadie | | | | | | |

**Table 1:** CoordinationTest Case 1 Challenge Identification

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Coordination-2 | |  |  | **Test Design By:** Michael Philotoff | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** November 30, 2014 | | |
| **Module Name:** Coordination | |  |  | **Test Executed By:** | | |
| **Test Title:** Rubik's Cube Identification and Alignment | | |  | **Test Execution Date:** | | |
| **Description:** Roadie correctly identifies the challenge Rubik's Cube within 5 seconds of the camera being turn on. Then Roadie aligns itself up with Rubik's Cube. | | | |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie has arrived at a challenge zone and has detected a challenge within 4 inches of Roadie | | | | |  |  |
| **Requirement Satisfied:** COR 6.3, COR 7, and COR 7.1 | | |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| 1 | Camera identifies Rubik's Cube |  | Rubik's Cube is identified |  |  |  |
| 2 | Camera measures the distance between | Pixels converted to inches | Distance measured |  |  |  |
| 3 | Strafe the distance measured by the Camera |  | Roadie strafes |  |  |  |
| 4 | Roadie moves forward 4 inches |  | Roadie moves forward |  |  |  |
| 5 | Roadie signals that it has arrived at the challenge |  | Roadie is at the Rubik's Cube |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie has aligned with the challenge and signals that it has arrived. | | | |  |  |  |

**Table 2:** CoordinationTest Case 2 Rubik’s Cube Identification and Aligment

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Coordination-3 | |  |  | **Test Design By:** Michael Philotoff | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** November 30, 2014 | | |
| **Module Name:** Coordination | |  |  | **Test Executed By:** | | |
| **Test Title:** Simon Carabiner Identification and Alignment | | |  | **Test Execution Date:** | | |
| **Description:** Roadie correctly identifies the challenge Simon Carabiner within 5 seconds of the camera being turn on. Then Roadie aligns itself up with Simon Carabiner. | | | |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie has arrived at a challenge zone and has detected a challenge within 4 inches of Roadie | | | | |  |  |
| **Requirement Satisfied:** COR 6.2, COR 7, and COR 7.1 | | |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| 1 | Camera identifies Simon Carabiner |  | Simon Carabiner is identified |  |  |  |
| 2 | Camera measures the distance between Simon Carabiner and Roadie | Pixels converted to inches | Distance measured |  |  |  |
| 3 | Strafe this distance measured from the Camera |  | Roadie strafes |  |  |  |
| 4 | Roadie moves forwards 4 inches |  | Roadie moves forward |  |  |  |
| 5 | Roadie signals that it has arrived at the challenge |  | Roadie is at the Simon Carabiner |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie has aligned with the challenge and signals that it has arrived at the challenge. | | | | |  |  |

**Table 3:** CoordinationTest Case 3 Simon Carabiner Identification and Alignment

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Coordination-4 | | |  | **Test Design By:** Michael Philotoff | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** November 30, 2014 | | |
| **Module Name:** Coordination | |  |  | **Test Executed By:** | | |
| **Test Title:** Etch-A-Sketch Identification and Alignment | | |  | **Test Execution Date:** | | |
| **Description:** Roadie correctly identifies the challenge Etch-A-Sketch within 5 seconds of the camera being turn on. Then Roadie aligns itself up with Etch-A-Sketch. | | | |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie has arrived at a challenge zone and has detected a challenge within 4 inches of Roadie | | | | |  |  |
| **Requirement Satisfied:** COR 6.4, COR 7, and COR 7.1 | | |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| 1 | Camera identifies Etch-A-Sketch |  | Etch-A-Sketch is identified |  |  |  |
| 2 | Camera measures the distance | Pixels converted to inches | Distance measured |  |  |  |
| 3 | Strafe the distance measured from the Camera |  | Roadie strafes |  |  |  |
| 4 | Roadie moves forward 4 inches |  | Roadie moves forward |  |  |  |
| 5 | Roadie signals that it has arrived at the challenge |  | Roadie is at the Etch-A-Sketch |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie has aligned with the challenge and signals that it has arrived at the challenge. | | | | |  |  |

**Table 4:** CoordinationTest Case 4 Etch-A-Sketch Identification and Alignment

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Coordination-5 | | |  | **Test Design By:** Michael Philotoff | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** November 30, 2014 | | |
| **Module Name:** Coordination | |  |  | **Test Executed By:** | | |
| **Test Title:** Playing Card Deck Identification and Alignment | | |  | **Test Execution Date:** | | |
| **Description:** Roadie correctly identifies the challenge Playing Card deck within 5 seconds of the camera being turn on. Then Roadie aligns itself up with Playing Card deck. | | | |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie has arrived at a challenge zone and has detected a challenge within 4 inches of Roadie | | | | |  |  |
| **Requirement Satisfied:** COR 6.5, COR 7, and COR 7.1 | | |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| 1 | Camera identifies Playing Card deck |  | Playing Card deck is identified |  |  |  |
| 2 | Camera measures the distance | Pixels converted to inches | Distance measured |  |  |  |
| 3 | Strafe the distance measured from the Camera |  | Roadie strafes |  |  |  |
| 4 | Roadie moves forward 4 inches |  | Roadie moves forward |  |  |  |
| 5 | Roadie signals that it has arrived at the challenge |  | Roadie is at the Playing Card deck |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie has aligned with the challenge and signals that it has arrived at the challenge. | | | | |  |  |

**Table 5:** CoordinationTest Case 5 Playing Card Deck Identification and Alignment

## Challenge Test Cases

The following test cases in **Table 6**, **Table 7**, **Table 8**, **Table 9**, **Table 10**, and **Table 11** test Roadie’s Challenge subsystem. **Table 6** tests Roadie’s ability to play the Simon Carabiner game for 15 seconds without pressing the wrong buttons. **Table 7** tests Roadie’s ability to react if Roadie presses the wrong button when playing Simon Carabiner game. **Table 8** test Roadie’s ability to complete the Playing Card challenge by picking up a single playing card. **Table 9** test Roadie’s ability to carry the Playing Card to the finish line after completing the Playing Card challenge. **Table 10** test Roadie’s ability to twist one row of a Rubik’s Cube 180 degrees. **Table 11** test Roadie’s ability to draw “IEEE” using an Etch-A-Sketch.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Challenge-1 | |  |  | **Test Design By:** Michael Philotoff | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** December 3, 2014 | | |
| **Module Name:** Challenge | |  |  | **Test Executed By:** | | |
| **Test Title:** Simon Carabiner Challenge | |  |  | **Test Execution Date:** | | |
| **Description:** Roadie plays Simon Carabiner correctly for 15 seconds | | | |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie has identified and aligned itself up with the Simon Carabiner | | | |  |  |  |
| **Requirement Satisfied:** CHA 1-10 | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| 1 | Roadie Presses the start button |  | Roadie powers on Simon |  |  |  |
| 2 | Roadie reads in the light values from Simon to determine which buttons to press | Array of light values | Roadie reads the light values from Simon |  |  |  |
| 3 | Roadie presses the color buttons in the order they lite up |  | Roadie correctly press the color buttons in order |  |  |  |
| 4 | Repeat steps 2 and 3 for 15 seconds | Time | Roadie plays Simon for 15 seconds |  |  |  |
| 5 | Roadie starts the process to leave the challenge zone |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie has correctly played Simon Carabiner for 15 seconds | | | |  |  |  |

**Table 6:** Challenge Test Case 1 Simon Carabiner Challenge

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Challenge-2 | |  |  | **Test Design By:** Michael Philotoff | | |
| **Test Priority:** Low | |  |  | **Test Designed Date:** December 3, 2014 | | |
| **Module Name:** Challenge | |  |  | **Test Executed By:** | | |
| **Test Title:** Fails Simon Carabiner Challenge | |  |  | **Test Execution Date:** | | |
| **Description:** Roadie pushes the wrong color button when | | |  |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie has identified and aligned itself up with the Simon Carabiner | | | |  |  |  |
| **Requirement Satisfied:** | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| 1 | Roadie Presses the start button |  | Roadie powers on Simon |  |  |  |
| 2 | Roadie reads in the light values from Simon to determine which buttons to press | Array of light values | Roadie reads the light values from Simon |  |  |  |
| 3 | Roadie presses the wrong color button |  | Roadie correctly press the color buttons in order |  |  |  |
| 4 | Roadie reads the failure signal from Simon Carabiner | Failure signal | Roadie stops playing Simon Carabiner |  |  |  |
| 5 | Roadie starts the process to leave the challenge zone |  | Roadie starts the process to leave the challenge zone |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie has fails to press the correct button when choose which color button to press and starts the process to leave the challenge zone | | | | | | |

**Table 7:** Challenge Test Case 2 Fails Simon Carabiner Challenge

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Challenge-3 | |  |  | **Test Design By:** Michael Philotoff | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** December 3, 2014 | | |
| **Module Name:** Challenge | |  |  | **Test Executed By:** | | |
| **Test Title:** Card Challenge | |  |  | **Test Execution Date:** | | |
| **Description:** Roadie picks up a single playing card | | |  |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie has identified and aligned itself up with the deck of playing cards | | | |  |  |  |
| **Requirement Satisfied:** CHA 19 and CHA 21 | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| 1 | Roadie presses down on the deck of playing cards |  | Roadie applies pressure to the deck of cards |  |  |  |
| 2 | Roadie picks up a single playing card |  | Roadie picks up a single playing card |  |  |  |
| 3 | Roadie starts the process to leave the challenge zone |  | Roadie starts leaving the challenge zone |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie has a pick up a playing card | | |  |  |  |  |

**Table 8:** Challenge Test Case 3 Card Challenge

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Challenge-4 | |  |  | **Test Design By:** Michael Philotoff | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** December 3, 2014 | | |
| **Module Name:** Challenge | |  |  | **Test Executed By:** | | |
| **Test Title:** Card Carrying | |  |  | **Test Execution Date:** | | |
| **Description:** Roadie carries a single playing card to the finish line | | |  |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie has completed the card challenge | | |  |  |  |  |
| **Requirement Satisfied:** CHA 20 and CHA 21 | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| 1 | Roadie holds on to the playing card that was pick up from the Card Challenge |  | Roadie is holding onto the playing card |  |  |  |
| 2 | Roadie executes the leaving procedure |  | Roadie leaves the challenge zone |  |  |  |
| 3 | Roadie enters line following state after executing the leave procedure |  | Roadie starts line following |  |  |  |
| 4 | Roadie crosses the finish line |  | Roadie reaches the finish line |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie carried a single playing card to the finish line | | | |  |  |  |

**Table 9:** Challenge Test Case 4 Card Carrying

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Challenge-5 | |  |  | **Test Design By:** Michael Philotoff | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** December 3, 2014 | | |
| **Module Name:** Challenge | |  |  | **Test Executed By:** | | |
| **Test Title:** Rubik's Cube Challenge | |  |  | **Test Execution Date:** | | |
| **Description:** Roadie twist a row of the Rubik's Cube 180 degrees | | |  |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie has identified and aligned up with the Rubik's Cube | | | |  |  |  |
| **Requirement Satisfied:** CHA 11-13 | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| 1 | Roadie holds on to the Rubik's Cube |  | Roadie has ahold of the Rubik's Cube |  |  |  |
| 2 | Roadie places turning device for the Rubik's Cube over the Rubik's Cube |  | Roadie placed the turning device onto the Rubik's Cube |  |  |  |
| 3 | Roadie turns the row of the Rubik's Cube 180 degrees |  | Roadie turned a row of the Rubik's Cube 180 degrees |  |  |  |
| 4 | Roadie removes the turning device from the Rubik's Cube |  | Roadie has removed the turning device |  |  |  |
| 5 | Roadie starts the process to leave the challenge zone |  | Roadie starts to leave the challenge zone |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie twisted a row of the Rubik's Cube 180 degrees | | | |  |  |  |

**Table 10:** Challenge Test Case 5 Rubik’s Cube Challenge

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Challenge-6 | |  |  | **Test Design By:** Michael Philotoff | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** December 3, 2014 | | |
| **Module Name:** Challenge | |  |  | **Test Executed By:** | | |
| **Test Title:** Etch-A-Sketch Challenge | |  |  | **Test Execution Date:** | | |
| **Description:** Roadie uses the Etch-A-Sketch to draw "IEEE" onto the Etch-A-Sketch | | | |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie has identified and aligned up with the Etch-A-Sketch | | | |  |  |  |
| **Requirement Satisfied:** CHA 14-18 | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| 1 | Roadie places the two caps over the left and right nobs of the Etch-A-Sketch |  | Roadie has placed the caps over the Etch-A-Sketch |  |  |  |
| 2 | Roadie twists the Etch-A-Sketch nobs to draw "IEEE" onto the Etch-A-Sketch |  | Roadie drew "IEEE" on the Etch-A-Sketch |  |  |  |
| 3 | Roadie removes the two caps over the two Etch-A-Sketch nobs |  | Roadie removed the two caps over the Etch-A-Sketch |  |  |  |
| 4 | Roadie starts the process to leave the challenge zone |  | Roadie starts to leave the challenge zone |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie draws "IEEE" on the Etch-A-Sketch and starts to leave the challenge zone | | | | |  |  |

**Table 11:** Challenge Test Case 6 Etch-A-Sketch Challenge

## Movement and Misc. Test Cases

The following test cases in **Table 12**, **Table 13**, **Table 14**, **Table 15**, **Table 16**, **Table 17**, **Table 18**, and **Table 19** test Roadie’s movement subsystem with some misc. test cases added into this section too. **Table 12** tests Roadie’s size to make sure Roadie does not violate the requirement giving the max size the robot can be. **Table 13** tests all of Roadie’s subsystems to insure Roadie can handle 3 different rounds at the completion. **Table 14** tests Roadie’s ability to turn on and off by using a switch. **Table 15** test Roadie’s ability to not leave the playing field while completing the course. **Table 16** test Roadie’s ability to following the guidance tape. **Table 17** tests Roadie’s ability to make a right turn when needed. **Table 18** tests Roadie’s ability to make a left turn when needed. **Table 19** test Roadie’s ability to make correction if Roadie’s veers off the guidance tape to the right.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Movement-1 | |  |  | **Test Design By:** Alex Senopoulos | | |
| **Test Priority:** Low | |  |  | **Test Designed Date:** November 29, 2014 | | |
| **Module Name:** Movement | |  |  | **Test Executed By:** | | |
| **Test Title:** Sizing | |  |  | **Test Execution Date:** | | |
| **Description:** Confirm size requirements for Roadie | | |  |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie will be motionless with its camera retracted. | | | |  |  |  |
| **Requirement Satisfied:** MOV 1 | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| **1** | Leave Roadie motionless |  |  |  |  |  |
| **2** | Measure dimensions | Width/Length/Height | Within 1ft.x1ft.x1ft. |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie will remain motionless | | |  |  |  |  |

**Table 12:** Movement Test Case 1 Sizing

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Movement-2 | |  |  | **Test Design By:** Alex Senopoulos | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** November 29, 2014 | | |
| **Module Name:** Movement | |  |  | **Test Executed By:** | | |
| **Test Title:** Roadie stress test | |  |  | **Test Execution Date:** | | |
| **Description:** Test life of Roadie's power to ensure at least 30 minute lifespan | | | |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie will start suspended with no wheel contact on ground and a full battery charge. Modified code uploaded to keep motors and sensors continually running. | | | | | | |
| **Requirement Satisfied:** MOV 2 | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| **1** | Suspend Roadie in place |  |  |  |  |  |
| **2** | Run all subsystems at normal operating capacity |  |  |  |  |  |
| **3** | Measure time until noticeable deterioration of wheel speed | Time (minutes) | Greater than 30 minutes |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie power source will have a less than nominal charge. | | | |  |  |  |

**Table 13:** Movement Test Case 2 Roadie Stress Test

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Movement-3 | |  |  | **Test Design By:** Alex Senopoulos | | |
| **Test Priority:** Low | |  |  | **Test Designed Date:** November 29, 2014 | | |
| **Module Name:** Movement | |  |  | **Test Executed By:** | | |
| **Test Title:** Power switch | |  |  | **Test Execution Date:** | | |
| **Description:** Ensure Roadie has easily accessible power switch | | |  |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie will be powered off at the starting area. | | |  |  |  |  |
| **Requirement Satisfied:** MOV 3 | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| **1** | Use power switch to provide power to Roadie |  | Roadie will receive power |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie will have power and execute loaded Arduino instructions. | | | |  |  |  |

**Table 14:** Movement Test Case 3 Power Switch

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Movement-4 | |  |  | **Test Design By:** Alex Senopoulos | | |
| **Test Priority:** Medium | |  |  | **Test Designed Date:** November 29, 2014 | | |
| **Module Name:** Movement | |  |  | **Test Executed By:** | | |
| **Test Title:** Surface Contact | |  |  | **Test Execution Date:** | | |
| **Description:** Ensure Roadie remains in contact with competition surface | | | |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie will be un-powered at starting area | | |  |  |  |  |
| **Requirement Satisfied:** MOV 4, MOV 5 | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| **1** | Turn on Roadie |  |  |  |  |  |
| **2** | Observe Roadie's execution of the competition from start to finish. |  | Roadie remains in contact with competition surface. |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie is motionless at the finish line. | | |  |  |  |  |

**Table 15:** Movement Test Case 4 Surface Contact

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Movement-5 | |  |  | **Test Design By:** Alex Senopoulos | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** November 29, 2014 | | |
| **Module Name:** Movement | |  |  | **Test Executed By:** | | |
| **Test Title:** Minimum oscillation line following | | |  | **Test Execution Date:** | | |
| **Description:** Ensure Roadie can efficiently follow straight guidance tape. | | | |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions: Roadie will be in a line following state with its sensor array over straight guidance tape.** | | | | |  |  |
| **Requirement Satisfied:** | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| **1** | Allow Roadie to run continuously along guidance tape. |  | Roadie will keep guidance tape within the bounds of its own wheels. |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie will arrive at the end of the guidance tape and have the tape between the bounds of the Roadie's wheels. | | | | | |  |

**Table 16:** Movement Test Case 5 Minimum Oscillation Line Following

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID** Movement-6 | |  |  | **Test Design By:** Alex Senopoulos | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** November 29, 2014 | | |
| **Module Name:** Movement | |  |  | **Test Executed By:** | | |
| **Test Title:** Right turn | |  |  | **Test Execution Date:** | | |
| **Description:** Ensure Roadie can navigate a right turn correctly | | |  |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie will approach a right turn in the guidance tape while in the line following state. | | | | |  |  |
| **Requirement Satisfied:** | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| **1** | Roadie approaches right turn with sensors over guidance tape |  |  |  |  |  |
| **2** | Roadie rotates leaves line following state and turns right 90 degrees | Angle of Roadie relative to new section of guidance tape | 10 degree margin of error |  |  |  |
| **3** | Roadie resumes line following state |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie will be in a line following state navigating along the guidance tape. | | | | |  |  |

**Table 17:** Movement Test Case 6 Right Turn

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Movement-7 | |  |  | **Test Design By:** Alex Senopoulos | | |
| **Test Priority:** High | |  |  | **Test Designed Date:** November 29, 2014 | | |
| **Module Name:** Movement | |  |  | **Test Executed By:** | | |
| **Test Title:** Left turn | |  |  | **Test Execution Date:** | | |
| **Description:** Ensure Roadie can navigate a left turn correctly | | |  |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie will approach a left turn in the guidance tape while in the line following state. | | | | |  |  |
| **Requirement Satisfied:** | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| **1** | Roadie approaches left turn with sensors over guidance tape |  |  |  |  |  |
| **2** | Roadie rotates leaves line following state and turns 90 degrees left | Angle of Roadie relative to new section of guidance tape | 10 degree margin of error |  |  |  |
| **3** | Roadie resumes line following state |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie will be in a line following state navigating along the guidance tape. | | | | |  |  |

**Table 18:** Movement Test Case 7 Left Turn

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project Name:** Roadie | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Test Case ID:** Movement-8 | |  |  | **Test Design By:** Alex Senopoulos | | |
| **Test Priority:** Medium | |  |  | **Test Designed Date:** November 29, 2014 | | |
| **Module Name:** Movement | |  |  | **Test Executed By:** | | |
| **Test Title:** Roadie veer too far right | |  |  | **Test Execution Date:** | | |
| **Description:** Roadie corrects movement for being off the line too far to the right | | | |  |  |  |
|  |  |  |  |  |  |  |
| **Pre-conditions:** Roadie is in the line following state with the two left most sensors over the guidance tape and the sensor array front facing away from the guidance tape. | | | | | | |
| **Requirement Satisfied:** | |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status(Pass/Fail)** | **Notes** |
| **1** | Roadie adjusts right side motor speed to a larger value than the left side | Motor rpm values for each wheel | Right side motors = 5000, Left side motors = 2000 |  |  |  |
|  |  |  |  |  |  |  |
| **Post-conditions:** Roadie's sensor array front will be facing towards the line | | | |  |  |  |

**Table 19:** Movement Test Case 8 Roadie Veer too far Right