**VR Dashboard**

Test Cases

Version *2.0*

*11/16/2015*

2. Compatibility Test Cases

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| --- | --- |
| ID | CT\_1 |
| Items to Test | Cross Operating System Compatibility |
| Preconditions | 1. FT\_19 - Start Program |
| Test Steps | 1. For 3 machines meeting minimum requirements outlined in SRS document, one with Windows 7, one with Windows 8 and one with Windows 10, perform the following tasks:    1. Observe Map Visualization with Oculus Rift       1. Allow visualization to run for 15 seconds       2. Enter investigation state by looking at a pin on the map and pressing the X button on the Dual Shock controller.       3. Exit investigation state by pressing O on the Dual Shock controller.    2. Observe Coaster Visualization with Oculus Rift       1. Allow visualization to run all the way through       2. Rewind the visualization partially       3. Press the right directional button on the Oculus Rift to switch the line being ridden       4. Let the visualization finish |
| Expected Results | 1. Visualizations should run without the following issues:    1. Visualization crashing    2. Visualization no longer accepting user input    3. Objects not fully rendering    4. Frame rate below 40fps 2. Visualizations respond to user input in the same way across systems. |
| Priority | High |
| Pass/Fail |  |

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| ID | CT\_2 |
| Items to Test | Cross Graphics Card Compatibility |
| Preconditions | 1. User has opened program 2. User has properly configured Oculus Rift and Dual Shock Controller. |
| Test Steps | 1. For 2 machines meeting minimum requirements outlined in SRS document, one with an nVidia graphics card, and one with an AMD graphics card, perform the following tasks:    1. Observe Map Visualization with Oculus Rift       1. Allow visualization to run for 15 seconds       2. Enter investigation state by looking at a pin on the map and pressing the X button on the Dual Shock controller.       3. Exit investigation state by pressing O on the Dual Shock controller.    2. Observe Coaster Visualization with Oculus Rift       1. Allow visualization to run all the way through       2. Rewind the visualization partially       3. Press the right directional button on the Oculus Rift to switch the line being ridden       4. Let the visualization finish |
| Expected Results | 1. Visualizations should run without the following issues:    1. Visualization crashing    2. Visualization no longer accepting user input    3. Objects not fully rendering    4. Frame rate below 40fps 2. Visualizations respond to user input in the same way across systems. |
| Priority | High |
| Pass/Fail |  |

3. Functional Test Cases

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| ID | FT\_1 |
| Items to Test | Forward Traversal of Graph in Coaster Visualization |
| Preconditions | 1. FT\_11 - Select Coaster Candidate |
| Test Steps | 1. Observe Map Visualization with Oculus Rift    1. Do not enter any input |
| Expected Results | 1. Experience of forward traversal of graph 2. Camera should move according to angle of line being ridden 3. Movement should stop when end of line is reached. 4. UI should update as defined in expected results of FT\_8 and FT\_10. |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_2 |
| Items to Test | Backwards Traversal of Graph in Coaster Visualization |
| Preconditions | 1. FT\_11 - Select Coaster Candidate |
| Test Steps | 1. Observe Coaster Visualization with Oculus Rift 2. Allow forward traversal to happen for at least one segment of the line graph. 3. Press L2 on the Dual Shock Controller 4. Release L2 on the Dual Shock Controller |
| Expected Results | 1. Experience of backwards traversal of graph while L2 is held down. 2. Camera should move according to angle of line being ridden 3. Movement should stop if beginning of line is reached. 4. UI should update as defined in expected results of FT\_8 and FT\_10. |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_3 |
| Items to Test | Pause/Play in Coaster Visualization |
| Preconditions | 1. FT\_11 - Select Coaster Candidate |
| Test Steps | 1. Observe Coaster Visualization with Oculus Rift 2. Allow forward traversal to happen for at least one segment of one line of the line graph. 3. Press the start button on the Dual Shock controller.    1. Observe that the visualization has stopped. 4. Press the start button on the Dual Shock controller    1. Observe that the visualization has resumed. |
| Expected Results | 1. The visualization should toggle between traversing as normal and pausing when the start button is pressed. |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_4 |
| Items to Test | Switch Lines / Reset Coaster Visualization |
| Preconditions | 1. FT\_11 |
| Test Steps | 1. Observe Coaster Visualization with Oculus Rift 2. Press either the left or right directional button on the d-pad of the dual shock controller |
| Expected Results | 1. The visualization should restart from the beginning on the line that is either to the left (if left directional button was pressed) or right (if right directional button was pressed) of the line originally being traversed. |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_5 |
| Items to Test | Pause/Play in Map Visualization |
| Preconditions | 1. FT\_20 - Select Map Visualization |
| Test Steps | 1. Press the start button    1. The visualization should stop updating.    2. UI should stop updating with new data 2. Press the start button again    1. Visualization should resume updating.    2. UI should start updating with new data again |
| Expected Results | 1. The visualization should toggle between updating and pausing when the start button is pressed. |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_6 |
| Items to Test | UI Toggle in Map Visualization |
| Preconditions | 1. FT\_20 - Select Map Visualization |
| Test Steps | 1. Press the Triangle button on the Dual Shock Controller    1. If UI display is visible, it should become invisible.    2. If UI display is not currently visible, it should become visible. |
| Expected Results | 1. The visualization should toggle between display and hiding the UI display when the triangle button is pressed. |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_7 |
| Items to Test | Coaster Headtracking |
| Preconditions | 1. FT\_11 - Select Coaster Candidate |
| Test Steps | 1. Look left and right 2. Look up and down 3. Look in diagonal directions 4. Tilt head clockwise 5. Tilt Head counter-clockwise 6. Move head forwards and backwards 7. Move head left and right |
| Expected Results | 1. The camera should copy the user’s head movements |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_8 |
| Items to Test | Coaster UI Graph Billboard |
| Preconditions | 1. FT\_11 - Select Coaster Candidate |
| Test Steps | 1. Look into far right of the environment for a billboard |
| Expected Results | 1. A billboard should be seen 2. Billboard should contain a 2D version of the lines in the coaster as viewed from the side 3. Billboard should contain a marker that follows the user’s position on the line currently being ridden. |
| Priority | Medium |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_9 |
| Items to Test | Coaster Controls Overlay Toggle |
| Preconditions | 1. FT\_11 - Select Coaster Candidate |
| Test Steps | 1. Press the triangle button on the Dual Shock Controller 2. Press the triangle button on the Dual Shock Controller again |
| Expected Results | 1. The visualization should start with the controls overlay visible 2. When the overlay is toggled it should disappear 3. When toggled again it should reappear in the same position it was previously in |
| Priority | Medium |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_10 |
| Items to Test | Coaster UI Ring Around Point |
| Preconditions | 1. FT\_11 - Select Coaster Candidate |
| Test Steps | 1. Look for a ring around each point of the line being ridden |
| Expected Results | 1. Should see a ring around each data point on the current line 2. Ring should contain a line of centered text containing a date. 3. Ring should contain another line below the first text line of centered text indicating a percentage. |
| Priority | Medium |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_11 |
| Items to Test | Select Coaster Candidate |
| Preconditions | 1. FT\_19 - Start Program |
| Test Steps | 1. The user looks at the Coaster Button on the Main Menu 2. The user presses the X button on the Dual Shock controller 3. The user looks at the name ‘Romney’ 4. The user presses the X button on the Dual Shock controller |
| Expected Results | 1. The visualization should start with the user riding the red line. |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_11\_2 |
| Items to Test | Select Different Coaster Candidate |
| Preconditions | 1. FT\_19 - Start Program |
| Test Steps | 1. The user looks at the Coaster Button on the Main Menu 2. The user presses the X button on the Dual Shock controller 3. The user looks at the name ‘Gingrich’ 4. The user presses the X button on the Dual Shock controller |
| Expected Results | 1. The visualization should start with the user riding the blue line. |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_12 |
| Items to Test | Map Headtracking |
| Preconditions | 1. FT\_20 - Select Map Visualization |
| Test Steps | 1. Look left and right 2. Look up and down 3. Look in diagonal directions 4. Tilt head clockwise 5. Tilt Head counter-clockwise 6. Move head forwards and backwards 7. Move head left and right |
| Expected Results | 1. The camera should copy the user’s head movements |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_13 |
| Items to Test | Map Rewind |
| Preconditions | 1. FT\_20 - Select Map Visualization |
| Test Steps | 1. Observe Map Visualization with Oculus Rift 2. Wait 10 seconds 3. Press L2 on the Dual Shock Controller 4. Release L2 on the Dual Shock Controller |
| Expected Results | 1. Data flows backwards in time while L2 is held down 2. Flow should stop if beginning of time is reached 3. UI should update with proper data as time is reversed |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_14 |
| Items to Test | Map Forward |
| Preconditions | 1. FT\_20 |
| Test Steps | 1. Observe Map Visualization with Oculus Rift 2. Ensure time is at least one unit from end 3. Press R2 on the Dual Shock Controller 4. Release R2 on the Dual Shock Controller |
| Expected Results | 1. Visualization updates faster while R2 is held down 2. UI updates faster while R2 is held down. |
| Priority | High |
| Pass/Fail |  |

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| ID | FT\_15 |
| Items to Test | Map Objects |
| Preconditions | 1. FT\_20 - Select Map Visualization |
| Test Steps | 1. Observe the map as the timeline plays |
| Expected Results | 1. Pin objects should be created as dates that have polls are reached in the timeline 2. Each Pin object should have Spheres on it arranged from largest to smallest 3. Each Sphere’s size should be proportionate to its respective candidate’s percentage of the poll 4. Each Sphere should have a color that isn’t duplicated for any other Spheres on its Pin 5. Old Pins should be replaced with a new Pin when a new poll occurs in a state that previously had a poll. |
| Priority | High |
| Pass/Fail |  |

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| ID | FT\_16 |
| Items to Test | Map Investigation Mode |
| Preconditions | 1. FT\_20 |
| Test Steps | 1. Allow visualization to reach 5/16/2012 2. Look at Michigan’s pin on the map 3. Press X on the Dual Shock controller while looking at Michigan’s pin. 4. Observe UI overlay that appears 5. Press Circle on the Dual Shock controller. |
| Expected Results | 1. An overlay should appear on the right side of the screen 2. This overlay should contain the following info:    1. State: Michigan    2. Observations: 15382    3. Each candidate’s name and polling percentage in the state being observed    4. Date |
| Priority | High |
| Pass/Fail |  |

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| ID | FT\_18 |
| Items to Test | Load Sample CSV |
| Preconditions | 1. The user has placed the sample CSV (included with test document) into the resources directory of the Unity project. 2. FT\_19 - Start Program |
| Test Steps | 1. Look at the CSV button 2. Press X on the Dual Shock controller 3. Look at sample CSV in the drop down menu. 4. Press X on Dual Shock controller to load the CSV. 5. Execute FT\_20 - Select Map Visualization 6. Look at a pin on the map 7. Press X to enter investigation mode 8. Wait until the date reaches 3/20/2012 9. Press the start button on the Dual Shock Controller |
| Expected Results | 1. Program returns to Main Menu after selecting the sample CSV 2. After step 7 the user should see the following (screenshot\*)   \* Screenshot currently unavailable until further implementation is completed |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_19 |
| Items to Test | Start Program |
| Preconditions | None |
| Test Steps | 1. User has opened program 2. User has properly configured Oculus Rift and Dual Shock Controller based on documentation provided with the products. |
| Expected Results | The program starts and a Main Menu screen is displayed that gives the following options:   1. Coaster Button 2. Map Button 3. Dropdown for loading CSV data |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_20 |
| Items to Test | Select Map Visualization |
| Preconditions | 1. FT\_19 - Start Program |
| Test Steps | 1. The user looks at the Map button on the Main Menu 2. The user presses the X button on the Dual Shock controller |
| Expected Results | 1. The screen changes to the map visualization and playback begins |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | FT\_21 |
| Items to Test | Coaster Fast-Forward |
| Preconditions | 1. FT\_11 - Select Coaster Candidate |
| Test Steps | 1. Observe Coaster Visualization with Oculus Rift 2. Press R2 on the Dual Shock Controller 3. Release R2 on the Dual Shock Controller |
| Expected Results | 1. Cart traverses the line faster while R2 is held down 2. Billboard UI updates faster while R2 is held down. |
| Priority | Medium |
| Pass/Fail |  |

4. Integration Testing

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| --- | --- |
| ID | IT\_1 |
| Items to Test | Map Data to Map Generator |
| Preconditions | 1. FT\_20 - Select Map Visualization |
| Test Steps | 1. Ensure that pins are generated. 2. Check that they accurately represent the candidates and percentages. This can be done as follows: 3. Enter investigation state for a pin. 4. Pause the visualization. 5. View poll date, candiates, and candidate percentages. 6. View the loaded CSV file and cross check information for accuracy. |
| Expected Results | 1. Data on screen should match CSV file. |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | IT\_2 |
| Items to Test | Rollercoaster Data to Rollercoaster Generator |
| Preconditions | 1. FT\_11 - Select Coaster Candidate |
| Test Steps | 1. Ensure that candidate lines are generated. 2. Check that they accurately represent the data by comparing the poll points to the loaded CSV file. |
| Expected Results | 1. The user should see lines that match the following screenshot\*   \* Screenshot TBD |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | IT\_3 |
| Items to Test | Rollercoaster Data to Rollercoaster UI |
| Preconditions | 1. FT\_11 - Select Coaster Candidate |
| Test Steps | 1. Ensure that displayed UI data matches data from CSV.   Data from CSV:  Coaster Event Marker Ring Around Point  Graph insert displaying 2d candidate lines |
| Expected Results | 1. Displayed UI data matches data from CSV. |
| Priority | High |
| Pass/Fail |  |

5. Performance Testing

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| --- | --- |
| ID | PT\_1 |
| Items to Test | 100000 CSV Row Load |
| Preconditions | 1. 100000 row CSV named stress.csv in project “CSV” folder 2. FT\_19 - Start Program |
| Test Steps | 1. Execute FT\_18 using stress.csv instead of the sample CSV |
| Expected Results | 1. Takes no more than 4 seconds from the time the Map button was selected to start the visualization. |
| Priority | Low |
| Pass/Fail |  |

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| --- | --- |
| ID | PT\_2 |
| Items to Test | Coaster FPS Test |
| Preconditions | 1. FT\_11 - Select Coaster Candidate |
| Test Steps | 1. Watch the Ffrmes per second in the upper left corner of the screen while performing the steps below 2. Press R2 to fast forward 3. Press L2 to rewind 4. Move the left analog stick in every direction for 4 seconds to pan the camera 5. Look around in every direction with the Oculus Rift 6. Shake head rapidly up and down 7. Shake head rapidly left and right 8. Look at a pin on the visualization and Press X 9. Press the start button to pause the visualization 10. Press the start button to resume the visualization |
| Expected Results | 1. The frames per second counter in the upper left corner of the PC screen (not oculus) doesn’t drop below 40 |
| Priority | Low |
| Pass/Fail |  |

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| ID | PT\_3 |
| Items to Test | Map FPS Test |
| Preconditions | 1. FT\_20 - Select Map Visualization |
| Test Steps | 1. Give all defined user input |
| Expected Results | 1. Frames per second doesn’t drop below 40 |
| Priority | Low |
| Pass/Fail |  |

6. System Testing

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| --- | --- |
| ID | ST\_1 |
| Items to Test | All Coaster Functionality |
| Preconditions | None |
| Test Steps | 1. FT\_18 - Load Sample CSV 2. FT\_11 - Select Coaster Candidate 3. FT\_7 - Coaster Headtracking 4. FT\_9 - Coaster Controls Overlay Toggle (Toggle Once) 5. FT\_3 - Pause/Play in Coaster Visualization 6. FT\_21 - Coaster Fast-Forward 7. FT\_2 - Coaster Rewind 8. FT\_4 - Switch Lines / Reset Coaster Visualization 9. FT\_9 - Coaster Controls Overlay Toggle (Toggle Once) |
| Expected Results | 1. All expected results of the functional tests referenced |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | ST\_2 |
| Items to Test | All Map Functionality |
| Preconditions | None |
| Test Steps | 1. FT\_18 - Load Sample CSV 2. FT\_20 - Select Map Visualization 3. FT\_12 - Map Headtracking 4. Pan camera 5. Raise Camera 6. Lower Camera 7. FT\_6 - UI Toggle in Map Visualization (Toggle Once) 8. FT\_5 - Pause/Play in Map Visualization 9. FT\_14 - Map Forward 10. FT\_13 - Map Rewind 11. FT\_6 - UI Toggle in Map Visualization (Toggle Once) 12. FT\_16 - Map Investigation Mode |
| Expected Results | 1. All functionality works as normal 2. UI updates properly in all situations |
| Priority | High |
| Pass/Fail |  |

# 7. User Acceptance Testing

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| --- | --- |
| ID | UAT\_1 |
| Items to Test | Coaster UAT |
| Preconditions | 1. FT\_18 - Load Sample CSV |
| Test Steps | 1. Users execute Steps 2 through 9 of ST\_1 in any order and with as many repetitions as they please. |
| Expected Results | 1. The users confirm that the visualization meets all the requirements given by the client |
| Priority | High |
| Pass/Fail |  |

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| --- | --- |
| ID | UAT\_2 |
| Items to Test | Map UAT |
| Preconditions | 1. FT\_18 - Load Sample CSV |
| Test Steps | 1. Users execute Steps 2 through 12 of ST\_2 in any order and with as many repetitions as they please. |
| Expected Results | 1. The users confirm that the visualization meets all the requirements given by the client |
| Priority | High |
| Pass/Fail |  |