Project Title: System Verification and Validation Plan for MECHTRON 4TB6

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1 Revision History

Date	Version	Notes
Date 1	1.0	Notes
Date 2	1.1	Notes

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2 Symbols, Abbreviations and Acronyms

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3 General Information

3.1 Summary

3.2 Objectives

3.3 Relevant Documentation

[Author (2019)]

4 Plan

4.1 Verification and Validation Team

4.2 SRS Verification Plan

4.3 Design Verification Plan

4.4 Implementation Verification Plan

4.5 Automated Testing and Verification Tools

4.6 Software Validation Plan

5 System Test Description

5.1 Tests for Functional Requirements

5.1.1 Area of Testing1

Title for Test

1. test-id1

   Control: Manual versus Automatic

   Initial State:

Input:

Output:

Test Case Derivation:

How test will be performed:

2. test-id2

    Control: Manual versus Automatic

    Initial State:

    Input:

    Output:

    Test Case Derivation:

    How test will be performed:

5.1.2 Area of Testing2

...

5.2 Tests for Nonfunctional Requirements

5.2.1 Performance

Operational in physical environment

1. Operational in physical enviornment

    Type: Dynamic, Manual

    Initial State: Device is on and mounted to the device, has connected to the application and is waiting to start measuring.

    Input/Condition: Vehicle's motor starts and values start to get picked up by device

    Output/Result: Device is operational and stays physically intact in all types of weather and at 20% greater than threshold values.

    How test will be performed: The device will be tested outdoors under various weather conditions including rain, windy, etc. The device will

also be tested in temperature and vibration conditions that are above threshold values. This will be performed by placing the device in a hot environment and vigoursly shaking it while being on a stationary mount.

2. Viewing live data

   Type: Dynamic, Manual

   Initial State: Device is on and mounted to the device, has connected to the application and is waiting to start measuring.

   Input: Vehicle's motor starts and values start to get picked up by device

   Output/Result: Data latency should be less than 30 seconds to simulate viewing live data.

   How test will be performed: The amount of time for data to start being viewable on the application will be inspected to be less than 30 seconds. The application will also be inspected to ensure that data is smooth and not lagging while measurements are being performed.

3. Modularity and Maintainability

   Type: Dynamic, Manual

   Initial State: Device is on measuring and sending values to the application, and connection to database has been verified

   Input: Either the device, application, or database is disconnected or turned off

   Output: The other two components are still functional even though communication between them is broken.

   How test will be performed: While device, application, and database are fully functional and communicating successfully, different combinations of either one or two components will be turned off. The other component(s) will be inspected to ensure that they are operational and indicating that the other component(s) are disconnected.

4. test-id2

Type: Functional, Dynamic, Manual, Static etc.

Initial State:

Input:

Output:

How test will be performed:

5. test-id2

Type: Functional, Dynamic, Manual, Static etc.

Initial State:

Input:

Output:

How test will be performed:

5.2.2 Usability

1. Mounting hardware and starting measurements

Type: Dynamic, Manual

Initial State: Device is turned off and nothing is connected, only the application is loaded on to the computer

Input: Users will be asked to setup device and start taking measurements, rate setup process using a survey

Output: Time for setup and data to appear on the application should be less than 5 minutes and

How test will be performed: A test group will be educated on the setup and connection of the device, then they will attempt to do that process. Each person will be timed and compared to the 5 minute threshold. In addition, they will be given a survey to rate the setup process on a scale from 1 to 5 the following categories: ease of use, need for assistance,

2. test-id2

Type: Dynamic, Manual

Initial State: Device is given to McMaster's Formula E team to use

Input: Using a survey, Formula E members will compare their current testing process to the Formulate process

Output: All users need to select Formulate in at least 2 of the 3 categories

How test will be performed: Formula E members will select which process is preferred in the following categories: speed, data collection, ease of use

3. test-id2

Type: Dynamic, Manual

Initial State:

Input:

Output:

How test will be performed:

5.3 Traceability Between Test Cases and Requirements

6 Unit Test Description

6.1 Unit Testing Scope

6.2 Tests for Functional Requirements

6.2.1 Module 1

1. test-id1

Type:

Initial State:

Input:

Output:

Test Case Derivation:

How test will be performed:

2. test-id2

   Type:
   Initial State:
   Input:
   Output:
   Test Case Derivation:
   How test will be performed:

3. ...

6.2.2   Module 2

...

6.3   Tests for Nonfunctional Requirements

6.3.1   Module ?

1. test-id1

   Type:
   Initial State:
   Input/Condition:
   Output/Result:
   How test will be performed:

2. test-id2

   Type: Functional, Dynamic, Manual, Static etc.
   Initial State:
   Input:
   Output:
   How test will be performed:

6.3.2 Module ?

...

6.4 Traceability Between Test Cases and Modules

References

Author Author. System requirements specification. https://github.com/...,
2019.

7   Appendix

This is where you can place additional information.

7.1   Symbolic Parameters

The definition of the test cases will call for SYMBOLIC_CONSTANTS. Their values are defined in this section for easy maintenance.

7.2   Usability Survey Questions?