I. Description of Overall Test Plan

Since this project deals with both hardware and software components, this test plan will split these two into separate portions, with a set of tests specifically for the integration of these two portions. The software tests will ensure that data is able to be read from all the sensors, the data is able to be properly modified, the data is able to be stored or retrieved, and that all software components can interact with one another. The hardware tests will ensure that the physical components are able send input to the software portions, as well as receive output to the screen and SD card.

II. Test Case Descriptions

2HTT	Sensor API – Laser Range Finder					
SA1.2	This test ensures that measurements from the laser range finder can be retrieved.					
SA1.3	This test will simulate a request for a distance measurement, and then expect to receive a reading from the laser range finder. For this test to be complete, a reading should be received from the sensor.					
SA1.4	Inputs: Simulated request for a laser range finder distance measurement sent to the Sensor API.					
SA1.5	Outputs: A distance measurement reading from the laser range finder.					
SA1.6	Normal					
SA1.7	Blackbox					
SA1.8	Functional					
SA1.9	Unit					
SA2.1	Sensor API – Inclinometer					
SA2.2	This test ensures that measurements from inclinometer can be retrieved.					
SA2.3	This test will simulate a request for an angle measurement, and then expect to receive a reading from the inclinometer. For this test to be complete, a reading should be received from the sensor.					
SA2.4	<i>Inputs:</i> Simulated request for an inclinometer angle measurement sent to the Sensor API.					
SA2.5	Outputs: An angle measurement reading from the inclinometer.					
SA2.6	Normal					
SA2.7	Blackbox					
SA2.8	Functional					
SA2.9	Unit					

SA3.1 SA3.2	Sensor API – Magnetometer This test ensures that measurements from magnetometer can be retrieved.					
SA3.3	This test will simulate a request for a cardinal direction measurement, and then expect to receive a reading from the magnetometer. For this test to be complete, a reading should be received from the sensor.					
SA3.4	Inputs: Simulated request for a magnetometer cardinal direction measurement sent to the Sensor API.					
SA3.5	Outputs: A cardinal direction measurement reading from the magnetometer.					
SA3.6	Normal					
SA3.7	Blackbox					
SA3.8	Functional					
SA3.9	Unit					
DP1.1 DP1.2	Data Processor – Request Reading This test ensures that the Data Processor can request and retrieve readings from the Sensor API.					
DP1.3	This test will simulate a request for a full measurement point, which should receive readings from all three sensors. For this test to be complete, it should be able to request and receive readings from all three sensors.					
DP1.4	Inputs: Simulated request for a full measurement point.					
DP1.5	Outputs: Readings from all three sensors.					
DP1.6	Normal					
DP1.7	Blackbox					
DP1.8	Functional					
DP1.9	Integration					
DP2.1	Data Processor – Data Formatting					
DP2.2	This test ensures that the Data Processor is able to combine all the readings into JSON formatting.					
DP2.3	This test will simulate the outputs from all three sensors, and the Data Processor format these points correctly into the JSON format. For this test to be complete, this JSON should match a manually generated format.					
DP2.4	Inputs: Simulated outputs from all three sensors.					
DP2.5	Outputs: Correctly formatted JSON format.					
DP2.6	Normal					
DP2.7	Blackbox					
DP2.8	Functional					
DP2.9	Unit					

DP3.1	Data Processor – Data Storage					
DP3.2	This test ensures that the Data Processor is able to store formatted data to the SD card.					
DP3.3	This test will simulate a formatted JSON input, and attempt to store it into the SD card. The SD card will then be opened on a separate computer, and the storage will be verified. For this test to be complete, the SD card must contain the same JSON that was simulated as an input.					
DP3.4	Inputs: Simulated JSON data.					
DP3.5	Outputs: JSON data read from a separate computer.					
DP3.6	Normal					
DP3.7	Blackbox					
DP3.8	Functional					
DP3.9	Integration					
DP4.1 DP4.2	Data Processor – Data Retrieval This test ensures that the Data Processor is able to retrieve formatted data to the SD card.					
DP4.3	This test will simulate storing JSON data on the SD card using a separate machine, and attempt to have the Data Processor read in this data. For this test to be complete, the Data Processor should output the same JSON that was stored using a separate machine.					
DP4.4	Inputs: Simulated JSON data placed on the SD card.					
DP4.5	Outputs: JSON data read from the SD card into the Data Processor.					
DP4.6	Normal					
DP4.7	Blackbox					
DP4.8	Functional					
DP4.9	Integration					
IO1.1	I/O Controller – Calculation Selection					
IO1.2	This test ensures that the I/O Controller chooses the appropriate calculation based off of the input command.					
IO1.3	This test will simulate the various commands that a user can choose from, and attempt to send the correct calculation command to the simulated Data Processor. For this test to be complete, the I/O Controller should output the correct calculation commands according to the user command.					
IO1.4	Inputs: Simulated user commands.					
IO1.5	Outputs: Calculation commands for the Data Processor.					
IO1.6	Normal					
IO1.7	Blackbox					
IO1.8	Functional					
IO1.9	Unit					

IO2.1 IO2.2	I/O Controller – Data Received This test ensures that the I/O Controller is able to interact with the Data Processor.						
IO2.3	This test will simulate user commands, and will attempt to receive simulated processed data from the Data Processor. For this test to be complete, the I/C Controller should be able to request and receive data from the Data Process						
IO2.4	Inputs: Simulated user commands and simulated processed data.						
IO2.5	Outputs: Simulated processed data from the Data Processor.						
IO2.6	Normal						
102.7	Blackbox						
IO2.8	Functional						
IO2.9	Integration						
PD1.1	Physical Device – Command Selection						
PD1.2	This test ensures that physical button interface is able to send a command to the I/O Controller.						
PD1.3	This test will send various user commands through the physical button interface to the I/O Controller.						
PD1.4	Inputs: User commands.						
PD1.5	Outputs: Commands received in the I/O Controller.						
PD1.6	Normal						
PD1.7	Blackbox						
PD1.8	Functional						
PD1.9	Integration						
PD2.1	Physical Device – Command Selection						
PD2.2	This test ensures that LCD screen is able to read output data from the I/O Controller.						
PD2.3	This test will send simulated processed data to the I/O Controller, and attempt to display this data on the LCD screen.						
PD2.4	Inputs: Simulated processed data.						
PD2.5	Outputs: Simulated processed data appearing on the LCD screen.						
PD2.6	Normal						
PD2.7	Blackbox						
PD2.8	Functional						
PD2.9	Integration						

III. Test Case Matrix

Test Case	Normal/ Abnormal	Blackbox <i>l</i> Whitebox	Functional/ Performance	Unit/ Integration
SA1	Normal	Blackbox	Functional	Unit
SA2	Normal	Blackbox	Functional	Unit
SA3	Normal	Blackbox	Functional	Unit
DP1	Normal	Blackbox	Functional	Integration
DP2	Normal	Blackbox	Functional	Unit
DP3	Normal	Blackbox	Functional	Integration
DP4	Normal	Blackbox	Functional	Integration
IO1	Normal	Blackbox	Functional	Unit
102	Normal	Blackbox	Functional	Integration
PD1	Normal	Blackbox	Functional	Integration
PD2	Normal	Blackbox	Functional	Integration