

Part I : Overall Test Plan

We will be approaching our test plan by building upon each part. We will be testing our sensors individually at first to make sure that we understand the communication channels and then we will test all the sensors together to make sure they can all work collectively and there are no issues with timing. The next part of our testing will be testing the application. This will involve integrating Grafana into our project to properly read the collected data, the data can be visualized within the application, and notifications can be sent to the app user when critical conditions are met. Once we know that our sensor system is working properly and can communicate with the app, we can then conduct our final test at the vineyard and make sure that the fully integrated system is working properly.

Part II : Test Case Descriptions

THST1.1	Temperature Humidity Sensor Test
THST1.2	This test will ensure that the sensor is accurately communicating data to the microcontroller.
THST1.3	This test will have the temperature and humidity sensor properly wired to our microcontroller and programmed to collect data points of the environment at a desired rate
THST1.4	Inputs: Environmental Temperature, Environmental Humidity
THST1.5	Outputs: Analog signal(0-5v) sent from the sensor to the microcontroller
THST1.6	Normal
THST1.7	Whitebox
THST1.8	Functional
THST1.9	Unit
THST1.10	Results: Accurate data received on the micro controller
LST1.1	Light Sensor Test
LST1.2	This test will ensure that the sensor is accurately communicating data to the microcontroller
LST1.3	This test will have the light sensor properly wired to our microcontroller and programmed to collect data points of the environment at a desired rate.
LST1.4	Inputs: Sunlight exposure
LST1.5	Outputs: Analog (0-5v) sent from the sensor to the microcontroller
LST1.6	Normal
LST1.7	Whitebox
LST1.8	Functional
LST1.9	Unit
LST1.10	Results: Accurate data received on the micro controller
RFST1.1	Rain Fall Sensor Test
RFST1.2	This test will ensure that the sensor is accurately communicating data to the microcontroller
RFST1.3	This test will have the rain sensor properly wired to our microcontroller and programmed to collect data points of the environment at a desired rate.

RFST1.4	Inputs: Rainfall
RFST1.5	Outputs: Analog (0-5v) sent from the sensor to the microcontroller
RFST1.6	Normal
RFST1.7	Whitebox
RFST1.8	Functional
RFST1.9	Unit
RFST1.10	Results: Accurate data received on the micro controller
SMST1.1	Soil Moisture Sensor Test
SMST1.2	This test will ensure that the sensor is accurately communicating data to the microcontroller
SMST1.3	This test will have the soil moisture sensor properly wired to our microcontroller and programmed to collect data points of the environment at a desired rate.
SMST1.4	Inputs: Moisture of the soil
SMST1.5	Outputs: Analog (0-5v) sent from the sensor to the microcontroller
SMST1.6	Normal
SMST1.7	Whitebox
SMST1.8	Functional
SMST1.9	Unit
SMST1.10	Results: Accurate data received on the micro controller
CST1.1	Collective Sensor Test
CST1.2	This test is to ensure that all the sensors can work at the same time and collect data without impacting the other sensors
CST1.3	This test will have all the sensors wired to our microcontroller and be able to manage the data points of multiple different types of sensors and different number of sensors at different locations to get different readings
CST1.4	Inputs: Temperature, humidity, light, rainfall, soil moisture, at different locations
CST1.5	Outputs: Analog (0-5v) sent from the sensor to the microcontroller
CST1.6	Normal
CST1.7	Whitebox
CST1.8	Functional
CST1.9	Integration
CST1.10	Results: Accurate data points from different locations
GDCT 1.1	Grafana Data Completion Test
GDCT 1.2	This test will ensure that all data being collected by all sensors is being received by Grafana.
GDCT 1.3	Once all sensor tests are completed, each datapoint collected by each sensor will be compared to the datapoints being collected in Grafana.
GDCT 1.4	Inputs: All sensor datapoints, expected Grafana datapoints.
GDCT 1.5	Outputs: Number of Grafana datapoints missing compared to sensor datapoints.
GDCT 1.6	Normal
GDCT 1.7	Blackbox
GDCT 1.8	Functional
GDCT 1.9	Integration

GDCT 1.10	Results: Successful interface between sensors, microcontroller, and Grafana
DVAUTS 1.1	Data Visualization Application Unit Test Suite
DVAUTS 1.2	This test will ensure that all parts of the data visualization application are working successfully for the end user.
DVAUTS 1.3	Comprehensive unit tests will be implemented for each module in the application.
DVAUTS 1.4	Inputs: Mocked data structures necessary for module execution.
DVAUTS 1.5	Outputs: Indication of success or failure for each module in the application.
DVAUTS 1.6	Normal
DVAUTS 1.7	Whitebox
DVAUTS 1.8	Functional
DVAUTS 1.9	Unit
DVAUTS 1.10	Results: Complete application functionality for the end user.
AST1.1	Alarm System Test
AST1.2	This test will ensure that when hazardous weather is present to send a notification to the app user to make the proper preparations
AST1.3	We will create a range for the sensors to read and if the data read by the sensor falls within that range, a notification will be sent out
AST1.4	Inputs: Sensor data, and simulated hazardous conditions
AST1.5	Outputs: A notification being sent to the user when a hazardous condition is present
AST1.6	Boundary
AST1.7	Whitebox
AST1.8	Performance
AST1.9	Integration
AST1.10	Results: A system to check for hazardous conditions and notifications sent when needed
SMATS 1.1	Supporting Microservice API Test Suite
SMATS 1.2	This test will ensure that the APIs of all supporting microservices are all functioning correctly.
SMATS 1.3	Comprehensive API tests will be implemented for each microservice supporting the application.
SMATS 1.4	Inputs: Mock API inputs and expected API responses
SMATS 1.5	Outputs: Indication of success or failure for each call to each API.
SMATS 1.6	Normal
SMATS 1.7	Blackbox
SMATS 1.8	Functional
SMATS 1.9	Unit
SMATS 1.10	Results: Complete microservice functionality in support of the application.
NFT1.1	Normal Field Test
NFT1.2	This test will ensure that the sensors are correctly placed within the vineyard and wired correction and able to send data to the app
NFT1.3	The sensors will be placed in desired locations in the vineyard and make sure that they are wired properly, and data can be collected in the wider area

NFT1.4	Inputs: Sensors across the vineyard, microcontroller, canopy, application
NFT1.5	Outputs: Fully integrated system
NFT1.6	Normal
NFT1.7	Whitebox
NFT1.8	Functional
NFT1.9	Integration
NFT1.10	Results: Fully functioning sensor monitoring system

Part III : Test Case Matrix

	Normal/Abnormal	Blackbox / Whitebox	Functional/ Performance	Unit/Integration
THST1	Normal	Whitebox	Functional	Unit
LST1	Normal	Whitebox	Functional	Unit
RFST1	Normal	Whitebox	Functional	Unit
SMST1	Normal	Whitebox	Functional	Unit
CST1	Normal	Whitebox	Functional	Integration
GDCT1	Normal	Blackbox	Functional	Integration
DVAUTS1	Normal	Whitebox	Functional	Unit
AST1	Boundary	Whitebox	Performance	Integration
SMATS1	Normal	Blackbox	Functional	Unit
NFT1	Normal	Whitebox	Functional	Integration