E1.05 – H. I. M.

Project Plan

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Date: October, 21, 2020

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Document Revision History Table		Template: 3/9/20
Version	Summary of Changes	Date
0.1	Section Owners assigned; draft Introduction added	10/4/20
0.5	First draft of all sections completed	10/10/20
0.9	All sections updated during team review	10/14/20
1.0	Version submitted for signatures	10/18/20
1.1	Revision post-IDR, changes to block diagrams, and sections 4 and 5	11/25/20

Contents

1 EXECUTIVE SUMMARY

The Executive Summary was written by Cameron Muir.

The product being produced is a heat island mapping device, this device logs weather data, and has the ability to upload it to a cloud service. This data can then be taken from the cloud and overlaid onto a map for an interactive way to visualize the information. The key features of the product include:

- Logging of temperature, humidity, GPS location, date, and time.
- Built-in display for the user to monitor device readings as well as get battery life estimates and error messages.
- Rechargeable battery with a *minimum* battery life of 4 hours.
- Compact and handheld casing for ease of use.

The purpose of this document is for the team and sponsors to have an organized document of how this product will be designed, built, and executed over the next few months. The team is made up of four members, Jose Silva (PM), Andrew Flores, Cameron Muir, and Gabriel Montero-Sierra. Each member will have their own subsystem that will be completed individually. These subsystems will be tested thoroughly by each individual to ensure functionality before being integrated together into a fully working device.

2 Product Block Diagram

The Product Block Diagram was written by Gabriel Montero

The figure 2.0.1 depicts the system block diagram, each subsystem is outlined and shown how they connect.

Power Subsystem - Andrew Flores

Data Collection Subsystem - Andrew Flores

Display Subsystem - Jose Silva

Mapping Subsystem - Cameron Muir

Storage Subsystem - Gabriel Montero

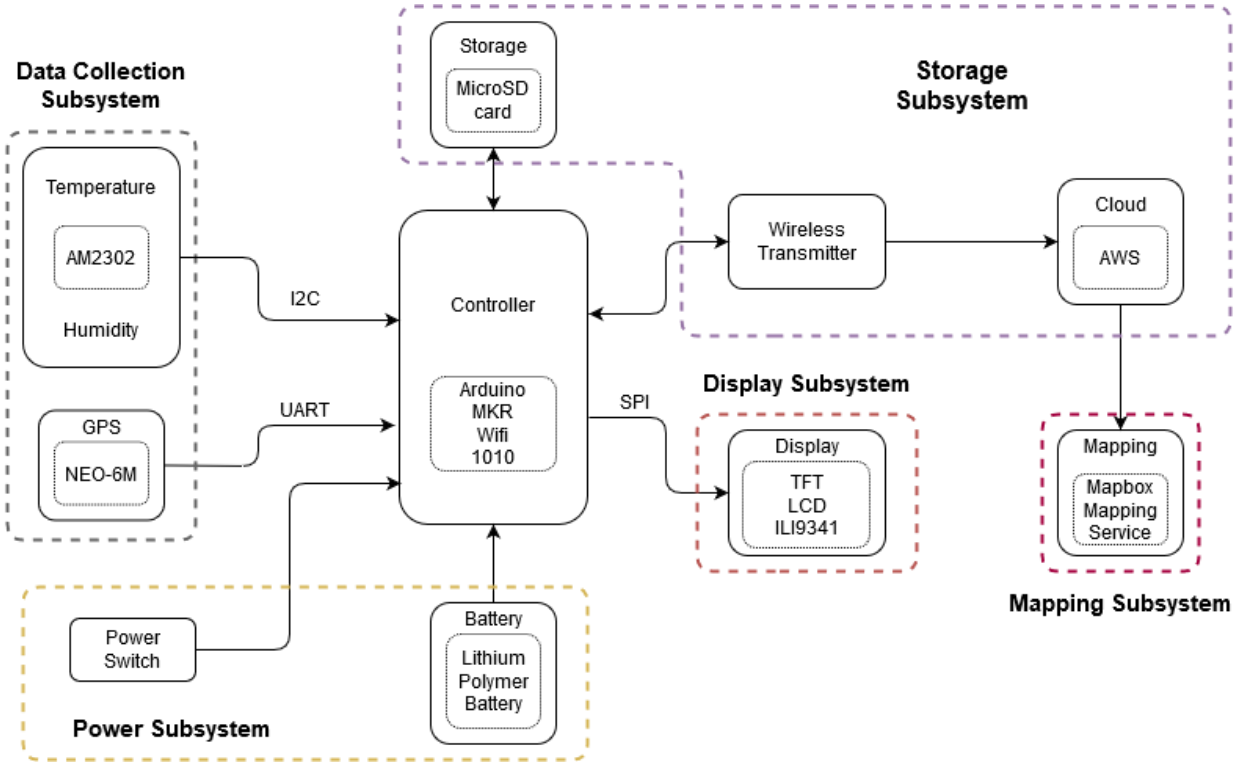


Figure 2.0.1: General Block Diagram

2.1 Power Subsystem

The Power System Subsystem is owned by Andrew Flores.

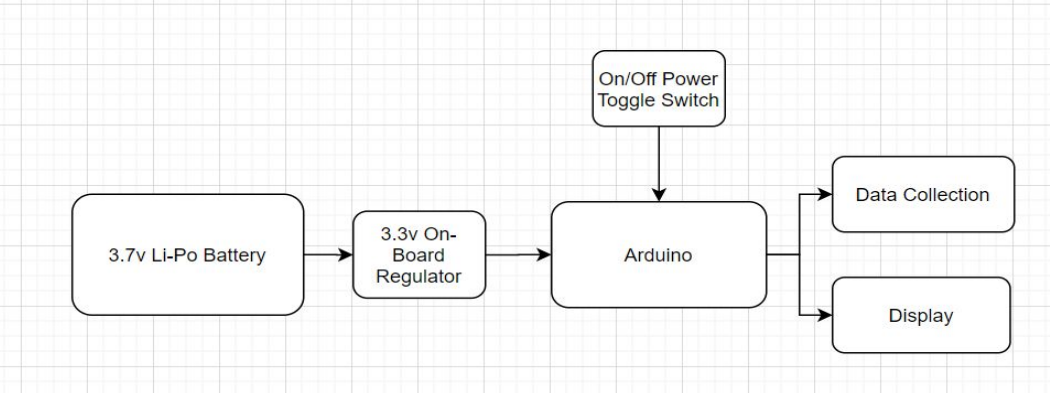


Figure 2.2.1

As shown in Figure 2.1.1, the system will include a battery and a power switch to power the Arduino board which will power the display.

Input	Source	Description
Charging circuit	On-Board Charger	The battery will be charged by an on-board charging port on the Arduino board.

Output	Destination	Description
5.0V Power	*Power Switch*	*The battery will run to a switch that will be used to power on and power off the device.*
5.0V power	*Arduino*	*The battery will supply the Arduino board with 5V*

Power System Milestones	
Milestone	**Date**
Subsystem Requirements Defined/Frozen	*09/30/2020*
Major Design Components Identified	*10/20/2020*
Design Complete and Approved	*11/09/2020*
Parts Ordered	*12/02/2020*
Initial Bring Up Start	*02/08/2020*
Full function Unit Test Complete	*03/08/2020*

2.2 Data Collection Subsystem

The Data Collection Subsystem is owned by Andrew Flores.

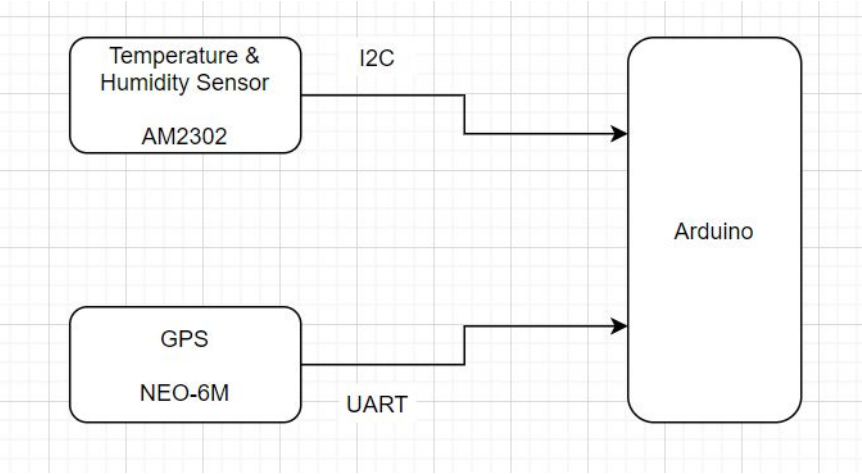


Figure 2.2.1

As shown in figure 2.2.1, the data collection subsystem is made up of a variety of sensors and a GPS for navigation. All of the elements will connect to the Arduino board.

Input	Source	Description
Temperature	Temperature Sensor	The temperature is measured and provided to the Arduino.
Humidity	Humidity Sensor	The humidity is measured and provided to the Arduino.
Position	GPS	Location is provided via coordinates.
Sunlight	Sunlight Sensor	Sunlight volume is measured and provided to the Arduino.

Output	Destination	Description
Data	Arduino	All measured data will be sent to the main board where it will be distributed to other subsystems from there.

Data Collection Milestones	
Milestone	**Date**
Subsystem Requirements Defined/Frozen	*09/30/2020*
Major Design Components Identified	*10/20/2020*
Design Complete and Approved	*11/09/2020*
Parts Ordered	*12/02/2020*
Initial Bring Up Start	*02/08/2020*
Full function Unit Test Complete	*03/08/2020*

2.3 Display Subsystem

The Display Subsystem is owned by Jose Silva.

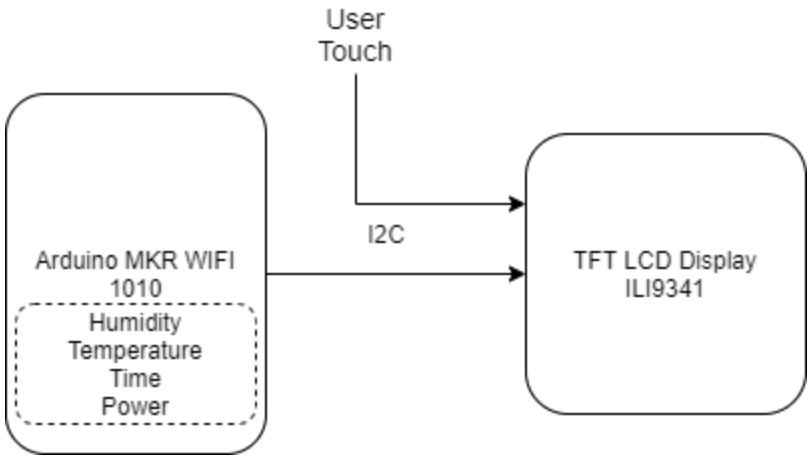


Figure 2.3.1: Display Block Diagram

Input	Source	Description
Temperature	Arduino	Updates temperature displayed once sensor is read by Arduino
Position	Arduino	Updates position displayed once sensor is read by Arduino
Humidity	Arduino	Updates humidity displayed once sensor is read by Arduino
Power	Arduino	Power level of Arduino sent to display

Output	Destination	Description
Local Display	TFT LCD Display	The recorded data consisting of humidity, temperature, time, and amount of battery life left will be shown on the display

Display Milestones	
Milestone	**Date**
Subsystem Requirements Defined/Frozen	*09/30/2020*
Major Design Components Identified	*10/20/2020*
Design Complete and Approved	*11/09/2020*
Parts Ordered	*12/02/2020*
Initial Bring Up Start	*02/08/2020*
Full function Unit Test Complete	*03/08/2020*

2.4 Mapping Subsystem

The Mapping Subsystem is owned by Cameron Muir.

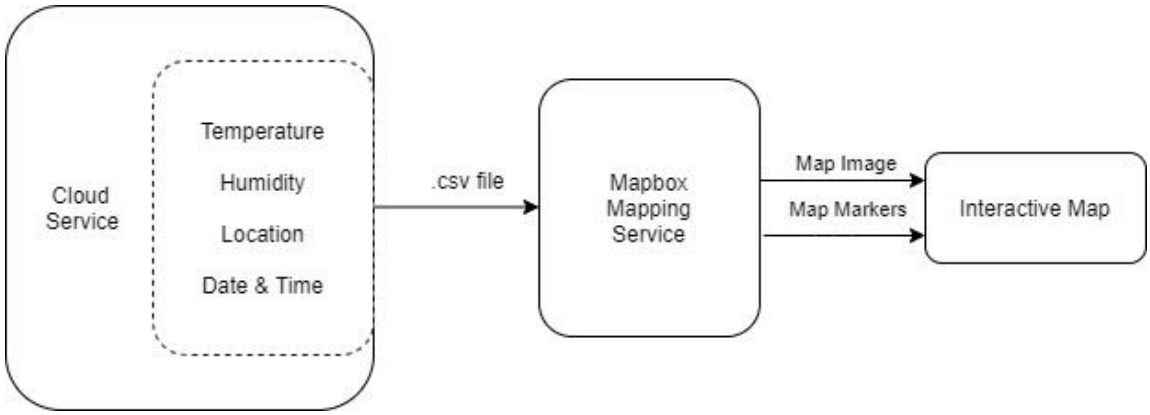


Figure 2.4.1 Mapping Block Diagram

As shown in Figure 2.4.1, the mapping overlay subsystem will take the data from the cloud, translate it to the Mapbox Service in a .csv file format, and finally produce an interactive map that shows the weather data in an easy to view form.

Input	Source	Description
Temperature	*Cloud Service*	*The ambient temperature uploaded from the device is brought into the mapping service in a .csv file format*
Humidity	*Cloud Service*	*The humidity uploaded from the device is brought into the mapping service in a .csv file format*
Location	*Cloud Service*	*The location of the data reading uploaded from the device is brought into the mapping service in a .csv file format*
Date and Time	*Cloud Service*	*The Date and Time data reading uploaded from the device is brought into the mapping service in a .csv file format*

Output	Destination	Description
Street level mapping image	*Mapbox*	*This is a standard mapping image that one will normally find in common mapping services, this lets the user know landmarks near the area they are looking at.*
Map marker	*Mapbox*	*For each data entry, there will be a colored indicator that will match a given temperature reading. Each marker will include the temperature, humidity, latitude, longitude, date, and time of the reading.*

Mapping Overlay Milestones	
Milestone	**Date**
Subsystem Requirements Defined/Frozen	*09/30/2020*
Major Design Components Identified	*10/20/2020*
Design Complete and Approved	*11/09/2020*
Parts Ordered	*N/A (free Software)*
Initial Bring Up Start	*02/08/2020*
Full function Unit Test Complete	*03/08/2020*

2.5 Storage Subsystem

The Storage Subsystem is owned by Gabriel Montero.

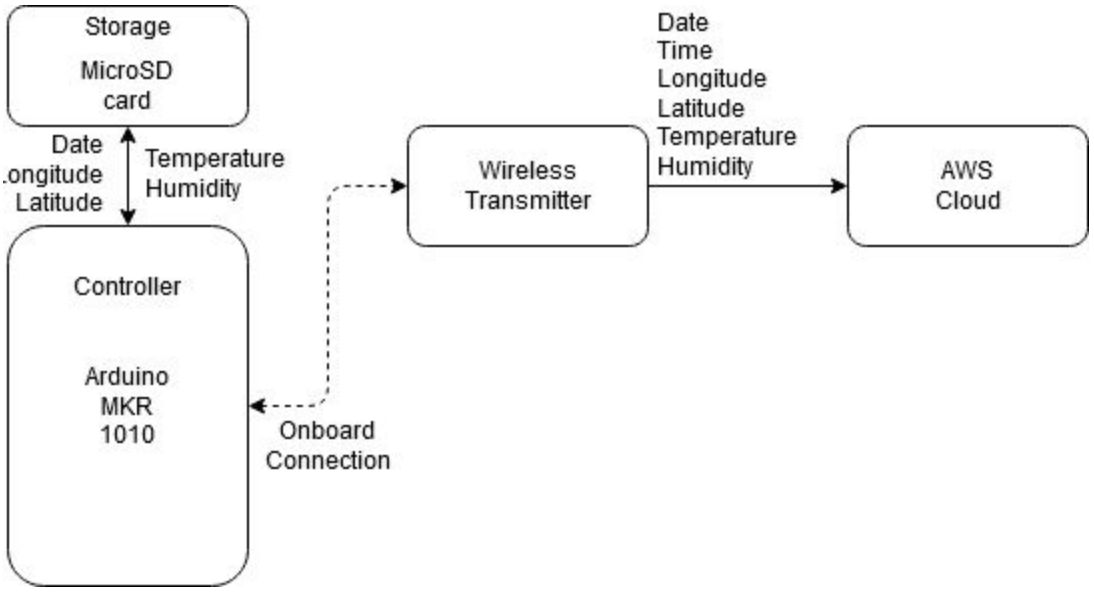


Figure 2.5.1 Storage Subsystem Block Diagram

As shown in Figure 2.5.1, the storage subsystem will receive data from sensors through the controller. The data would then be transmitted via a wireless transmitter and uploaded to the cloud.

Input	Source	Description
Temperature Data	Arduino	Stores temperature data once sensor read by Arduino
Position Data	Arduino	Stores GPS data once sensor read by Arduino
Humidity Data	Arduino	Stores humidity data once sensor read by Arduino

Output	Destination	Description
Data	Cloud Service	The recorded data consisting of humidity, temperature, location, and time will be stored off board to be analyzed

Storage Overlay Milestones	
Milestone	**Date**
Subsystem Requirements Defined/Frozen	*09/30/2020*
Major Design Components Identified	*10/20/2020*
Design Complete and Approved	*11/09/2020*
Parts Ordered	*N/A (free Software)*
Initial Bring Up Start	*02/08/2020*
Full function Unit Test Complete	*03/08/2020*

3 Project Schedule

The Project Schedule was created by Jose Silva

The Project Schedule specifies milestones and the amount of resources needed for this project. Refer to the attached PDFs for the D1 and D2 Gantt Charts.

4 Development Costs

Written by Andrew Flores

The development cost is an estimated value based on labor hours and material cost for the entire duration of the project. Detailed descriptions of the costs will be provided in the following tables throughout the section. The estimated cost for this project is $67,000.

4.1 Labor Categories and Burdened Hourly Cost Estimate

The following table lists the positions of staff associated with the entire project as well as the area of the project that each position will be involved in.

Labor Categories Required	
Category	**Justification**
Digital Design Engineer	Microcontroller, Display, Sensors
Analog Design Engineer	Data transmission, Device communication
Software Engineer	Mapping software, Cloud storage, Autonomous programming
Test Engineer	Subsystem testing
Technical Writer	Product documentation for interfaces and subsystems
Technician	Maintenance on individual devices and battery, as well as troubleshooting.
Fabricator/Assembler	Construction of the device chassis
Project Manager	Scheduling, planning and coordination
People Manager/Supervisor/HR	n/a, there is no HR involved
Consultants	Part selection, performance requirements, product standards.
Contractors	n/a, there are no contractors

Table 1

The following table shows the base salaries for each staff member. The table also includes the burden rate and burden cost along with the estimated hours required for each staff member. The total cost estimation can also be found on the table. All salaries were found using “glassdoor”.

Labor Cost using estimated salary and burden	Burden rate= 65%			
Labor Category	Hourly Salary	Burden Cost/hour	Hours Required	Cost of Labor
Digital Design Engineer	$58.00	$95.00	180	$17,100.00
Analog Design Engineer	$50.00	$83.00	50	$4,150.00
Software Engineer	$53.00	$87.00	215	$18,705.00
Test Engineer	$34.00	$57.00	70	$3,990.00
Technical Writer	$28.00	$46.00	30	$1,380.00
Technician	$28.00	$46.00	20	$920.00
Fabricator/Assembler	$15.00	$25.00	25	$625.00
Project Manager	$55.00	$91.00	180	$16,380.00
Consultants	$37.00	$61.00	15	$915.00
		Total:	785	$64,165.00

Table 2

Material Costs – Non-Capital Expenditures

The following table lists the materials needed for the device along with the cost of each item.

Non-Capital Expeditures		
Task	Material	Cost
Power/Data Collection/Data Transmission	Aruino MKR Board	$33.90
Data Collection	GPS	$39.95
Data Collection	Temperature/Humidity Sensor	$15.00
Data Storage	Micro SD	$2.95
Microcontroller Interface	Touchscreen Display	$29.95
Device Power	Lithium Polymer Battery	$14.95
	Total:	$136.70

Table 3

4.2 Capital Expenditures

The following table shows the capital expenditures for equipment needed for the construction and testing of the device.

Capital Expediture Estimate					
Task	Equipment	Est'd Cost	Hourly Rate	Hours Needed	Total Cost
Build Chassis	3D Printer (TXST)	$6,000.00	$20.00	3	$60.00
Test Device	Oscilliscope(TXST	$10,000.00	$500.00	4	$2,000.00
				Total:	$2,060.00

Table 4

4.3 Total Estimated Project Costs

The following table shows the total sum and final estimate of the cost for the project start to finish.

Project Labor & Material Cost Summary	
Cost Category	Estimated Cost
Cost of Labor	$64,165.00
Non-Capital Expenses	$136.70
Allocated Capital Expenses	$2,060.00
Total Estimated Project Cost	$66,361.70

Table 5

5 Test Procedures

The Test Procedures were written by all team members of Heat Island Mapping.

Test Plan Overview	
Power Subsystem Unit Tests	**DRI**
1. Battery Life Test at maximum power draw	Andrew Flores
2. Battery Charge Time test	Andrew Flores
Display Subsystem Unit Tests	**DRI**
1. Display Visibility	Jose Silva
2. Display Data	Jose Silva
Mapping Subsystem Unit Tests	**DRI**
1. File import test	Cameron Muir
2. Map refresh test	Cameron Muir
3. Overall functional test	Cameron Muir
Storage Subsystem Unit Tests	**DRI**
1. File Storage test	Gabriel Montero
2. File transmission test	Gabriel Montero
3. Wireless transmission speed test	Gabriel Montero
Overall System Integration Tests	**DRI**
1. Device Data Collection	Jose Silva
2. Cloud Uploading	Jose Silva
3. Mapping Overlay	Jose Silva
4. Durability Test	Jose Silva
5. Water Resistivity Test	Jose Silva

Table 6

5.1 Power Subsystem Unit Tests

The Power Subsystem Unit Test section was written by Andrew Flores

5.1.1 Battery Life Test at Maximum Power Draw

Test 1.1	Written by: Andrew Flores 11/23/2020
Subsystem: Power/Battery	Tested by: Andrew Flores TBD
Equipment Required:	Current Meter, load resistor, prototype system and battery
Description: This test is to confirm that the minimum battery life of 4 hours will be met by the system. In order to simulate the worst case load of the sensor array a power resistor will be used.	
Overall Results: TBD	

#	Procedure	Expected Result	Actual Result	Comments:
1	Fully charge the battery, confirm voltage is above 3.3V	>3V	TBD	
2	Connect load resistor to 3.3V	625mA	TBD	
3	Set timer and monitor battery voltage until it drops below minimum level of 3V	> 240 minutes	TBD	
4	Continue test until battery shutdown. NOTE: This has the potential to permanently damage the battery.	> 15 minutes	TBD	
5	Disconnect system and label battery to indicate it has gone through a deep discharge.	n/a	TBD	

5.1.2 Battery Recharge Test at Maximum Capacity

Test 1.2	Written by: Andrew Flores 11/23/2020
Subsystem: Power/Battery	Tested by: Andrew Flores TBD
Equipment Required:	Battery, Charger, DMM
Description: This test is to confirm that the recharge time is reasonable to be able to recharge the battery when it is at its lowest capacity to full capacity to use for the next day. A guideline to follow is that the recharge time is about the same as the discharge time.	
Overall Results: TBD	

#	Procedure	Expected Result	Actual Result	Comments:
1	Fully discharge the battery to where current=0A	0A	TBD	
2	Connect battery to charger and check hourly for 4 hours	hr1=25% hr2=50% hr3=75% hr4=100 %	TBD	
3	If it is not fully charged after 4 hours, leave it charging and check capacity every 10 minutes until the battery reaches max capacity.	<4.5hr= 100%	TBD	

5.2 Display Subsystem Unit Tests

The Display Subsystem Unit Tests were written by Jose Silva

5.2.1 Display Visibility

Test 2.1		Written by: Jose Silva 10/5/2020
Subsystem: Display		Tested by: Jose Silva
Equipment Required:	Arduino, TFT LCD Display, power supply	
Description: This test is to confirm that the display panel is visible in direct sunlight and dims after an allotted amount of time.		
Overall Results: TBD		

#	Procedure	Expected Result	Actual Result	Comments:
1	Connect TFT display to Arduino	Display turns on	TBD	
2	Insert SD card with preloaded data to display	Code should take data from SD card and display the values	TBD	
3	Wait 30 seconds	Display should go to low power mode and dim	TBD	
4	Wait another 30 seconds	Display should go to sleep mode and turn off	TBD	
5	Tap on display	Display should turn back on with newly recorded data displayed	TBD	

5.2.2 Display Data

Test 2.2		Written by: Jose Silva 10/5/2020
Subsystem: Display		Tested by: Jose Silva
Equipment Required:	Arduino, TFT LCD Display, power supply	
Description: This test is to confirm that the display panel displays the correct information given by the sensors		
Overall Results: TBD		

#	Procedure	Expected Result	Actual Result	Comments:
1	Connect TFT LCD display to Arduino	Display turns on	TBD	

2	Arduino will send data from SD card to Display	Display displays pseudo data	TBD	

Notes/Comments: To be tested Spring 2021

5.3 Mapping Subsystem Unit Tests

The Display Subsystem Unit Tests were written by Cameron Muir

5.3.1 File Import Test

Test 3.1		Written by: Cameron Muir 11/24/2020
Subsystem: Mapping		Tested by: Cameron Muir
Equipment Required:	Windows PC, Access to internet, access to AWS Cloud and Mapbox	
Description: This test is to confirm that a .csv file can be imported from Amazon Web Services (AWS) into the Mapbox mapping service.		
Overall Results: TBD		

#	Procedure	Expected Result	Actual Result	Comments:
1	Receive AWS bucket link from Cloud Subsystem	N/A	N/A	A link was established and used to download a test '.csv' file on 11/24/2020
2	Generate a simple test code to import and display lat/long values from the .csv file	Test map displayed	TBD	

5.3.2 Map Refresh Test

Test 3.2		Written by: Cameron Muir 11/24/2020
Subsystem: Mapping		Tested by: Cameron Muir
Equipment Required:	Windows PC, Access to internet, access to AWS Cloud and Mapbox	
Description: This test is to confirm that the map generated can be refreshed with any new data every hour. Keeping the map up to date based on any uploads throughout the day.		
Overall Results: TBD		

#	Procedure	Expected Result	Actual Result	Comments:
1	Receive AWS bucket link from Cloud Subsystem	N/A	N/A	A link was established and used to download a test '.csv' file on 11/24/2020
2	Generate a simple test code to import and display lat/long values from the .csv file	.csv imported	TBD	
3	Generate code to import the given .csv file every hour.	N/A	TBD	
4	For 2 hours update the .csv test file with new data points and verify they are loaded into the map	Map updated every hour	TBD	

5.3.3 Map Refresh Test

Test 3.3		Written by: Cameron Muir 11/25/2020
Subsystem: Mapping		Tested by: Cameron Muir
Equipment Required:	Windows PC, Access to internet, access to AWS Cloud and Mapbox	
Description: This test is to confirm that a generated map is interactive with any additional features such as zooming in and out, or clicking on individual readings to find more details about them.		
Overall Results: TBD		

#	Procedure	Expected Result	Actual Result	Comments:
1	Open map using generated link by Mapbox	Map should open	TBD	
2	Test zooming in and out of the map.	Map should scale dependin g on zoom	TBD	
3	Click on individual data points and verify information appears relating to temperature, humidity, latitude, longitude, date, and time appear	Data points should generate a pop up	TBD	

5.4 Storage Subsystem Unit Tests

The Display Subsystem Unit Tests were written by Gabriel Montero

5.4.1 File Storage Test

Test 4.1		Written by: Gabriel Montero 11/25/2020
Subsystem: Storage		Tested by: Gabriel Montero
Equipment Required:	Arduino, MicroSD, Windows PC, Power Supply	
Description: This test is to confirm that inputs are put into a .csv file and can be stored onboard by the microSD card module.		
Overall Results: TBD		

#	Procedure	Expected Result	Actual Result	Comments:
1	Feed data to the Arduino, as if the data is coming from sensors.	.csv file formatted	TBD	Data is fed from PC to Arduino through pins and is stored in .csv format on the microSD card. To be tested in Spring 2021.
2	Verify files on microSD.	.csv format	TBD	Checking to see if the data stored on the microSD card is formatted properly.

5.4.2 File Transmission Unit Test

Test 4.2		Written by: Gabriel Montero 11/25/2020
Subsystem: Storage		Tested by: Gabriel Montero
Equipment Required:	Arduino, MicroSD, Windows PC, Access to internet, access to AWS Cloud	
Description: This test is meant to confirm that the Arduino can upload data to AWS Cloud.		
Overall Results: TBD		

#	Procedure	Expected Result	Actual Result	Comments:
1	Input a test file into a microSD card.	.csv test file in a microSD card	TBD	Placing a file into microSD to later upload to cloud.
2	Wifi module connection	Wifi connection	TBD	Checking for wifi connection to upload data.
3	Upload file from microSD card to AWS Cloud	file uploaded to cloud	TBD	Checking if the test file is successfully uploaded to the cloud.
4	Create data buffer if wifi is not connected	Buffer created	TBD	If wifi is not connected, then a buffer is created for data that needs to be uploaded. Once wifi is connected, upload the buffered data.

5.4.3 Wireless Transmission Speed Unit Test

Test 4.3		Written by: Gabriel Montero 11/25/2020
Subsystem: Storage		Tested by: Gabriel Montero
Equipment Required:	Arduino, MicroSD, Windows PC, Access to internet, access to AWS Cloud	
Description: This test is to check the transmission speed of the wifi module.		
Overall Results: TBD		

#	Procedure	Expected Result	Actual Result	Comments:
1	Connect Arduino to wifi	wifi connected	TBD	Check to see if the Arduino is able to connect to wifi.
2	Transmit test file through wifi to cloud	Less than 10 seconds	TBD	Monitor how long it took for the data to transmit with respect to how large the file was.

5.5 System Integration Unit Tests

The System Integration Unit Tests were written by Jose Silva

5.5.1 Device Data Collection

Test 5.1		Written by: Jose Silva 11/25/2020
Subsystem: Complete System		Tested by: Jose Silva
Equipment Required:	Complete prototype, weather app with local San Marcos area	
Description: This test is to confirm that the device can properly record the ambient temperature and humidity of San Marcos		

Overall Results: TBD

#	Procedure	Expected Result	Actual Result	Comments:
1	Go outside anywhere in the San Marcos area and turn on the device	Device turns on	TBD	
2	Insert a new SD card	Device recognizes SD card	TBD	
3	Walk around the area	Device records data and displays last data recorded	TBD	Device should dim and go into low power mode when not interacted with after 30 seconds.
4	Check weather app for the local San Marcos area	Data displayed matches the reported weather	TBD	

5.5.2 Cloud Uploading

Test 5.2		Written by: Jose Silva 11/25/2020
Subsystem: Complete System		Tested by: Jose Silva
Equipment Required:	Complete prototype, laptop with Chrome, Safari, Bing, and Firefox search engines	
Description: This test is to confirm that the device can upload recorded data from local storage to the cloud server		
Overall Results: TBD		

#	Procedure	Expected Result	Actual Result	Comments:
1	Go outside anywhere in the San Marcos area and turn on the device	Device turns on	TBD	
2	Insert a new SD card	Device recognizes SD card	TBD	
3	Walk around the area with WIFI capabilities	Device records data and displays last data recorded	TBD	Device should dim and go into low power mode when not interacted with after 30 seconds.
4	Tap button on display labeled “Cloud Storage URL”	URL is displayed	TBD	The URL is the link to the cloud storage
5	Turn on laptop and enter URL into Chrome, Safari, Bing, and Firefox	Cloud storage is viewed	TBD	

5.5.3 Mapping Overlay

Test 5.3		Written by: Jose Silva 11/25/2020
Subsystem: Complete System		Tested by: Jose Silva
Equipment Required:	Complete prototype, laptop with Chrome, Safari, Bing, and Firefox search engines	
Description: This test is to confirm that the recorded data from the cloud storage is viewed on Mapbox mapping software		
Overall Results: TBD		

#	Procedure	Expected Result	Actual Result	Comments:
1	Go outside anywhere in the San Marcos area and turn on the device	Device turns on	TBD	
2	Insert a new SD card	Device recognizes SD card	TBD	
3	Walk around the area with WIFI capabilities	Device records data and displays last data recorded	TBD	Device should dim and go into low power mode when not interacted with after 30 seconds.
4	Tap button on display labeled “Mapping Overlay URL”	URL is displayed	TBD	The URL is the link to the Mapbox mapping overlay
5	Turn on laptop and enter URL into Chrome, Safari, Bing, and Firefox	Interactive map is shown	TBD	

5.5.4 Durability Test

Test 5.4		Written by: Jose Silva 11/25/2020
Subsystem: Complete System		Tested by: Jose Silva
Equipment Required:	Complete prototype, height of 3’ from hard, smooth concrete	
Description: This test is to confirm that the device can withstand a drop of 3’ without loss of functionality		
Overall Results: TBD		

#	Procedure	Expected Result	Actual Result	Comments:
1	Go outside anywhere in the San Marcos area and turn on the device	Device turns on	TBD	
2	Insert a new SD card	Device recognizes SD card	TBD	
3	Drop the device from 3’ onto the sidewalk	Device is still functional	TBD	
4	Repeat 5 times (6 in total)	Device is still functional	TBD	2 drops on 3 edges down, minor cosmetic damage is acceptable

5.5.5 Water Resistivity Test

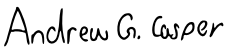
Test 5.5		Written by: Jose Silva 11/25/2020
Subsystem: Complete System		Tested by: Jose Silva
Equipment Required:	Complete prototype, showering can with water	
Description: This test is to confirm that the device can withstand 3 full showerings from a watering can held above 2’ from device without any visible entry of liquid into enclosure and remain functional.		
Overall Results: TBD		

#	Procedure	Expected Result	Actual Result	Comments:

1	Place device with display screen facing up	N/A	N/A	
2	Fill watering can and shower water over device from 3’ above	No water is entered into the enclosure	TBD	
3	Repeat 2 more times (3 in total)	No water is entered into the enclosure	TBD	
4	Inspect device exterior	Device remains functional	TBD	
5	Inspect interior of enclosure	No water is entered into the enclosure	TBD	

6 Approvals

The signatures of the people below indicate an understanding in the purpose and content of this document by those signing it. By signing this document, you indicate that you approve of the Project Plan.

Approver Name	Title	Signature	Date
Jose Silva	Project Manager		11/25/2020
Andrew Casper	D2 Project Manager		11/28/2020
Semih Aslan	Faculty Advisor		12/2/2020
Lee Hinkle	Sponsor		
Mark Welker	Instructor		

Author	Word Count
Cameron Muir	457
Gabriel Montero-Sierra	514
Andrew Flores	841
Jose Silva	1142