FUNCTIONAL REQUIREMENTS:

Display Console functional (MUST-HAVE):

1.0 – A user shall be able to review the date and time.

1.1 – A user shall be able to review daily rainfall totals every second.

1.2 – A user shall be able to view the temperature in degrees Fahrenheit or Celsius and humidity in cubic grams every second.

1.3 – A user shall be able to review wind speed in miles per hour and wind direction every second.

1.4 – A user shall be able to turn on and off the weather sensor from the console.

1.5 – A user shall be able to review their local weather forecast, which will display an icon depicting the type of weather to be expected.

1.6 – A user shall be able to retrieve and display sensor status information from their console. (Battery level, hardware failures, etc.)

Display Console functional (NICE-TO-HAVE):

2.0 – A user should have the ability to set different alarms to warn of inclement weather, such as floods, high wind, and freezing temperatures.

2.1 – A user should have the ability to review a month's worth of historical weather data through graphs and statistics on the console.

2.2 – A user should have the ability to use view all weather sensor measurements from all weather sensors within a 1,000 foot operating range. (Rather than only measurements coming from the sensor which came connected to the display console.

Weather Sensor functional (MUST-HAVE):

3.0 - The sensor shall collect weather data via hardware and process the data to be transmitted to display console and weather tower.

3.1 - The sensor shall transmit weather data every second to display console.

3.3 - The sensor shall be able to report the status of its hardware components.

Advanced User (Technician) functional (MUST-HAVE):

4.0 – An advanced user shall have the ability to retrieve a report regarding weather station status from the weather station.

Weather Tower functional (MUST-HAVE):

5.0 - The tower shall be able to generate a weather forecast prediction.

5.1 - The tower shall be able to report its current weather forecast prediction to display console.

NON-FUNCTIONAL REQUIREMENTS:
General User Authentication non-functional (NICE-TO-HAVE):
6.0– A user shall be able to be identified by his/her unique username.
6.1 – Each user shall have the option be required to input a password for console access.
6.2 – A user shall have the ability to configure the console during setup, such as inputting the date, time, coordinates, and geographic location.
6.3 – A user shall have the ability to perform a hard reset to return device to factory settings.
6.4 – A user should have the ability to manually update software/firmware.

Display Console non-functional (MUST-HAVE):
7.0 – The system shall run a self-check routine every minute to ensure weather sensor and weather tower connectivity. (A self-check routine which will alert the user if normal operation is impossible.)

Weather Sensor non-functional (MUST-HAVE):
8.1 – The sensor shall transmit weather measurements every 20 seconds to the weather tower. (This allows the tower to archive weather data.)

Weather Sensor non-functional (NICE-TO-HAVE):
9.0 – The system shall provide a wide ranging spectrum of frequencies and a lengthy transmission distance. (The system will test a wide spectrum of frequencies to ensure at least one frequency will allow transmission of data.)
9.1 – The system shall repeatedly send transmission queries to the console and weather station. (Similar to a self-check routine to ensure the device is performing its normal functions and to ensure real-time updates.)

9.2 – The system shall be able to self-check component status and report its degree of functionality (health). (Another self-check routine but most concerned about alerting user/technician if there is a problem with device.)
9.3 – The system shall be able to save its state if faced with a catastrophic event. (This feature is to ensure that all data is captured and recorded before device fails.)

Weather Tower (MUST-HAVE):

10.1 – The system shall be able to preserve all incoming data transmitted by a weather senor into a data archive. (This is a system function that stores all weather measurements throughout the day.)

Weather Tower (NICE-TO-HAVE)

11.2 The system shall be able to retrieve any weather measurement data within a month’s time span from the archive. (The user will have the ability to compare weather measurements against all-weather measurements that occurred within a month time span.)
11.5 – The system should be able to notify users of software updates. (An alert to ensure system is up-to-date and lessens vulnerabilities within the system.)
11.6 – The system should have the ability to remotely update console software.

Changes to this iteration of the System Specification Document include reducing the scope to be more manageable in this time frame. Some must have requirements were downgraded to nice to have requirements, and a few requirements were cut entirely (actively retrieving a month’s worth of archive weather data from a text file housed in the weather tower, dynamic graphs that displayed weather changes, etc.).