Wildfire Detection Device User Manual

User Requirements

1. ***Phone with SMS Capabilities***

The user must have access to a phone with SMS capabilities in order to receive text message alerts. These alerts are the primary alarm method that the Wildfire Detection System utilizes when a fire occurs.

2. ***Computer with Internet Access***

The user must have access to a computer with internet access in order to view the environmental data that the device collects. It is also the only way that the user can see the estimation of the probability of a fire occurring. There is no other method to view the collected information within the scope of this project.

3. ***LTE Reception***

The location that the Wildfire Detection System is placed must have reliable LTE reception. Within the scope of this project, the device can only transmit data via the LTE cellular network.

4. ***Exposure to Sunlight***

The location that the Wildfire Detection System must be regularly exposed to sunlight. The device is powered entirely off of solar power. Due to this, the solar panel must have consistent sunlight in order for the device to function as intended.

5. ***Sparse Tree Cover***

The location that the Wildfire Detection System must be under dense tree cover. In addition to the exposure to sunlight, the device also needs the GPS module to send and receive unobstructed signals.

6. ***Routine Maintenance***

The user must maintain the stations by visiting them at least once every six months to inspect the equipment for damage or malfunction.

Mounting Locations

1. Device Placement

The device should be placed in an area that is exposed to consistent sunlight for the functionality of the solar panel. The area of placement should also not be densely covered by trees so the GPS signal will not be obstructed. It should be placed in an area that receives LTE cell signal of a minimum strength of -104dBm. The device should also be able to be accessed easily for routine maintenance.

2. Sensors, Cameras, and GPS Module

The sensors will either be placed in the ground or mounted on the sides of the device for the intended environmental data measurement. The rainfall sensor will be placed to where it can easily catch rain. The temperature will not be placed in direct sunlight in order to only measure ambient temperature. The four cameras will be placed atop a PVC pole in order to increase their FOV. The cameras will be arranged so that they capture a 360° FOV. The GPS module will be placed atop the polycarbonate casing in order to send and receive unobstructed signals.

3. Battery, MCU, GSM Module and Charge Controller Positioning

The battery, MCU, GSM Module, and charge controller will be placed inside of the polycarbonate casing. These components do not need to be exposed to the environment. Because the battery and MCU can produce heat, they will be separated from the other electrical components.

4. Solar Panel and Antenna Positioning

The solar panel will be placed atop the polycarbonate casing in a position that will collect the most solar energy. The antenna will also be placed outside of the casing, in order to send unobstructed signals. The antenna will be separated from all metal material in order to minimize signal interference.