Development/Test Plan

This document is intended to lay out the remaining development decisions to be made, development work left to be done, and testing required to validate a populated board. Once complete, a fully functional device will be able to accept necessary data from Android app, run evapotranspiration calculation, and determine/execute irrigation schedule. Work not addressed in this guide includes enclosure design/fabrication and irrigation management evaluation/optimization.

Device Modes:

Configuration Mode: In config mode, the device will interact with Android application to receive required data and to configure RTC. A recalibration signal can also be sent to initiate a flood sequence.

Operation Mode: In op mode, the device is in a configured and installed state. This mode consists of the following states:

- Advertise
- Active Sense
- Schedule
- Irrigate

Configuration Mode Development Decisions:

1. Agree upon latitude data member location in FFS(flash file system).
2. Agree upon area data member location in FFS(flash file system).
3. Agree upon signal/data location for calibration flag/signal.
4. Agree upon interface/mechanism to update/configure RTC.
5. Determine entry and exit mechanism of config mode. (Advertise all the time?)

Configuration Mode Development/Test:

1. Successfully connect to device via Android app. (Enter configuration mode.)
2. Transmit and store latitude data.
3. Transmit and store area data.
4. Transmit time data and configure RTC.
5. Transmit recalibration signal.
6. Successfully disconnect from device via Android app. (Exit configuration mode.)
7. Calibrate SMS sensor(must be done in field.)
    1. Soil dry reading
    2. Soil saturation reading

Operation Mode Development/Test:

Advertise State:

1. Advertise BLE
2. Successfully connect to Android application.(Enter Config Mode)
3. Advance to Active Sense state upon receiving RTC interrupt.
4. Advance to Irrigation state upon receiving RTC interrupt(Note there are two.)

Active Sense State:

1. Accurately sense temperature data.
    1. Test in climate controlled room.
    2. Test in refrigerated environment.
2. Store temperature value.
3. Sense and store SMS value.
4. Sense and store RD value.
5. Advance to Schedule State.

Schedule State:

1. Compute and update evapotranspiration term using latest stored data.
2. Compute and update irrigation need.
3. Configure RTC for Irrigation state interrupt.
4. Advance to Advertise state.

Irrigate State:

1. Translate irrigation need into flow sensor revolutions.
2. Actuate water flow.
3. Deactivate water flow once flow sensor revolutions is met.
4. Advance to Advertise state.