Intel-IrriS

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PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA

Intelligent Irrigation System for Low-cost Autonomous Water Control in Small-scale Agriculture

Intel-IrriS

Building the Intel-IrriS LoRa IoT platform Part 2: edge-enabled gateway (WaziGate)

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UNIVERSITÉ DE PAU ET DES PAYS DE L'ADOUR

LIUPPA

WAZIup
IoT – from idea to reality
WAZIhub

Review: Technology components

Sensor part

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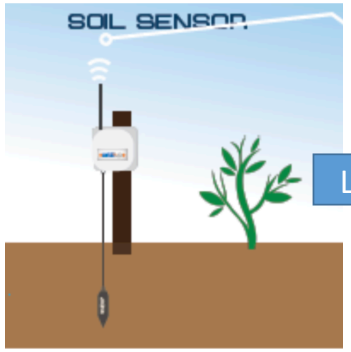
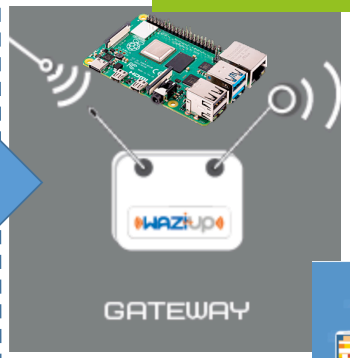


LPWAN

Control part



Embedded Database

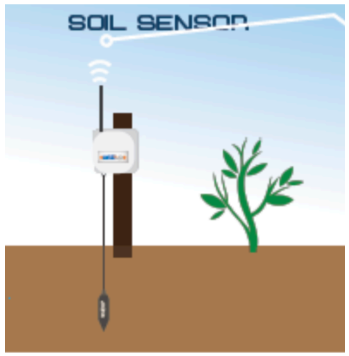
Software updates

Embedded User Interface

Review: Low-cost sensors

Sensor part

Intel-IrriS



- Build on low-cost, low-power IoT expertise
- Increase accuracy of low-cost sensors by automatic and remotely controlled procedures for advanced calibration
- Enable deployment of several complementary low-cost sensors
- Include agricultural models / knowledge with corrective & predictive analytics

Review: Smart embedded control

- Build on low-cost embedded & open IoT gateway expertise
- Implement the “Intelligent Irrigation in-the-box” with "plug-&-sense" approach
- Model complex water-soil-plant interaction
- Embed Decision Support System (DSS) and disruptive Artificial Intelligence (AI)
- Integration of various knowledge streams
- Fully autonomous

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Review: Starter-kits

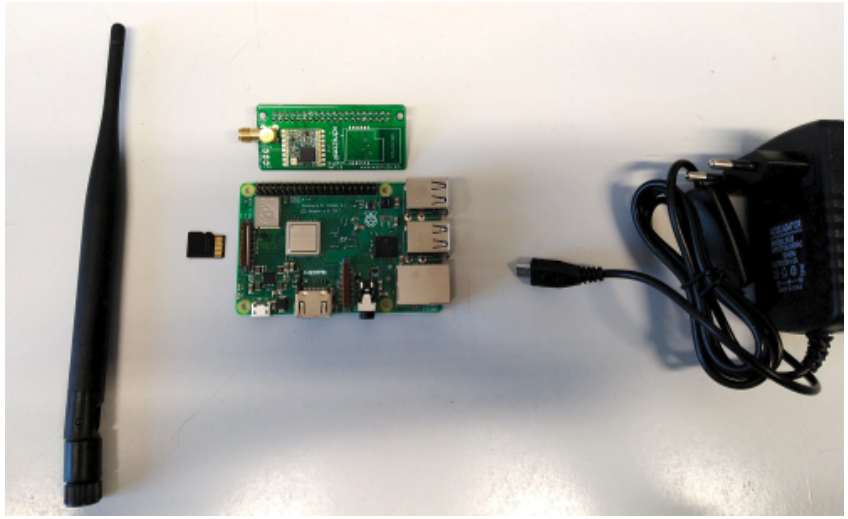
- "Intelligent Irrigation in-the-box", "plug-&-sense"
- At least 100 starter-kit will be distributed

WaziGate

- WaziGate is an IoT LoRa Gateway developed by WAZIUP
- WaziGate implements the edge-enabled IoT gateway approach
  - customized applications can be directly hosted in the gateway
  - the gateway can easily work without Internet connectivity
  - data are available to end-users in an embedded database
  - web-based visualization module provides graphical user interface
- You can find all the WaziGate documentation on the WaziGate documentation page. There are 4 main sections describing the generic WaziGate main features:
  - Quick start: https://www.waziup.io/documentation/wazigate/v2/quick_start/
  - Installation: https://www.waziup.io/documentation/wazigate/v2/install/
  - LoRaWAN: https://www.waziup.io/documentation/wazigate/v2/lorawan/
  - WaziApps: https://www.waziup.io/documentation/wazigate/v2/waziapps/
  - Look at the generic installation video: https://youtu.be/DvGdmdsGZHA

Install your WaziGate (1)

- **INTEL-IRRIS WaziGate distribution (RPI3B/3B+/4B)**
  - comes pre-configured with a soil sensor device
  - will work out-of-the box with the INTEL-IRRIS soil sensor device
  - will be updated to host the INTEL-IRRIS irrigation application
  - **Download the INTEL-IRRIS WaziGate SD card image from project website**
  - http://intel-irris.eu/results
  - Select EU868 or EU433 image
  - Flash the SD card image on 8GB SD card class 10



Look at the INTEL-IRRIS WaziGate video
Video n°4 at t=124s: https://youtu.be/j-1Nk0tv0xM?t=124

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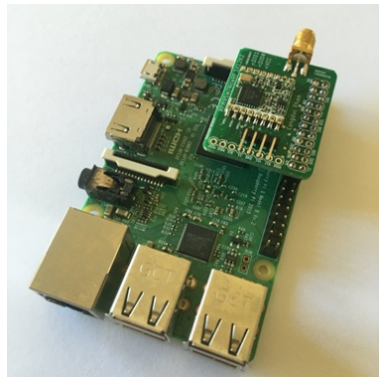
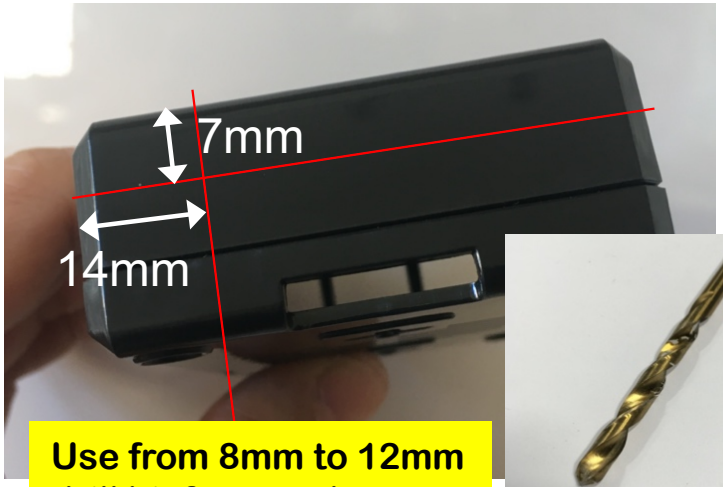
Install you WaziGate (2)

- Recommended RPI model is RPI3B
  - plug in the radio LoRa hat
  - The OLED screen is optional



- Drill a hole for the SMA connector on the RPI enclosure, SD card slot side



Use from 8mm to 12mm drill bit for metal

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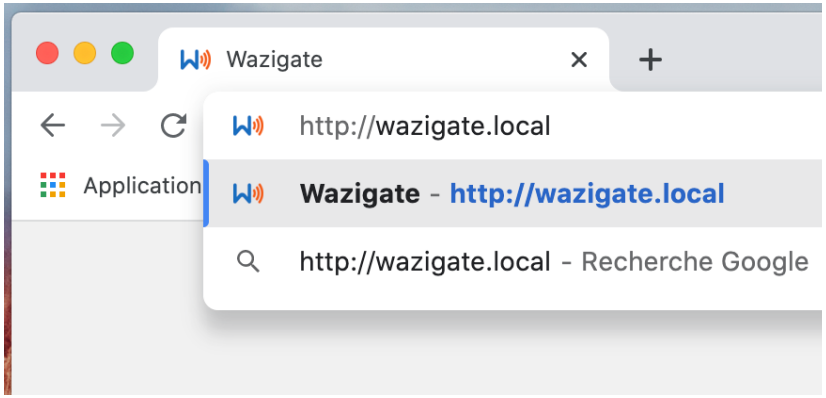
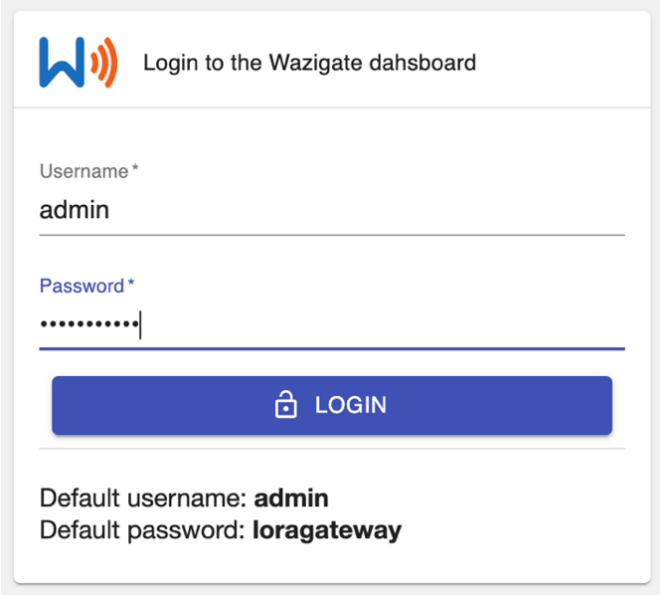
Accessing your WaziGate

- Power the WaziGate, no Internet is required, wait 3-4mins (boot)
- Connect to WAZIGATE_XXXXXXXXXXXX WiFi network
  - default WiFi password is loragateway
- Open web navigator. Go to http://wazigate.local or http://10.42.0.1



http://wazigate.local

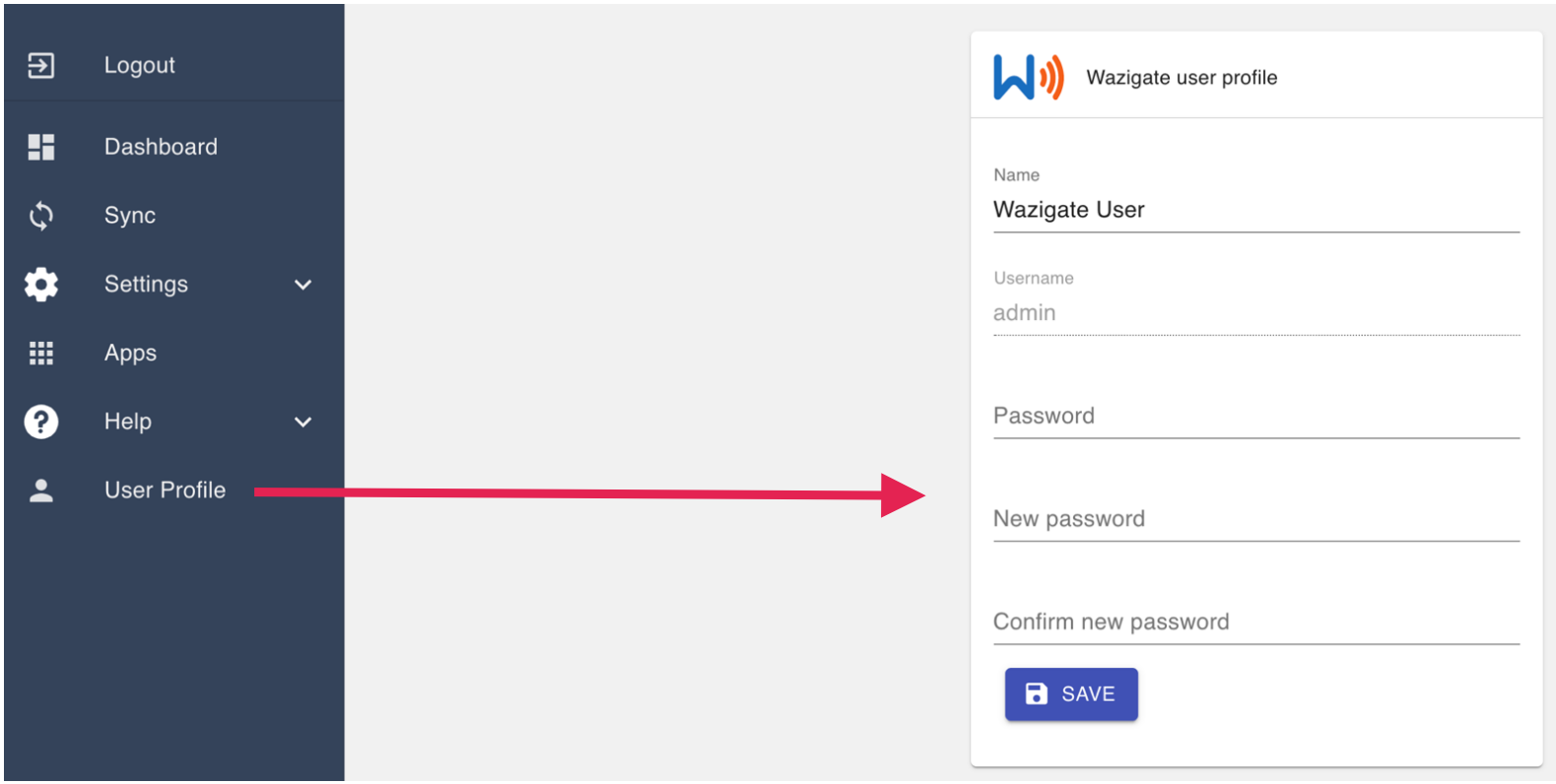
http://10.42.0.1



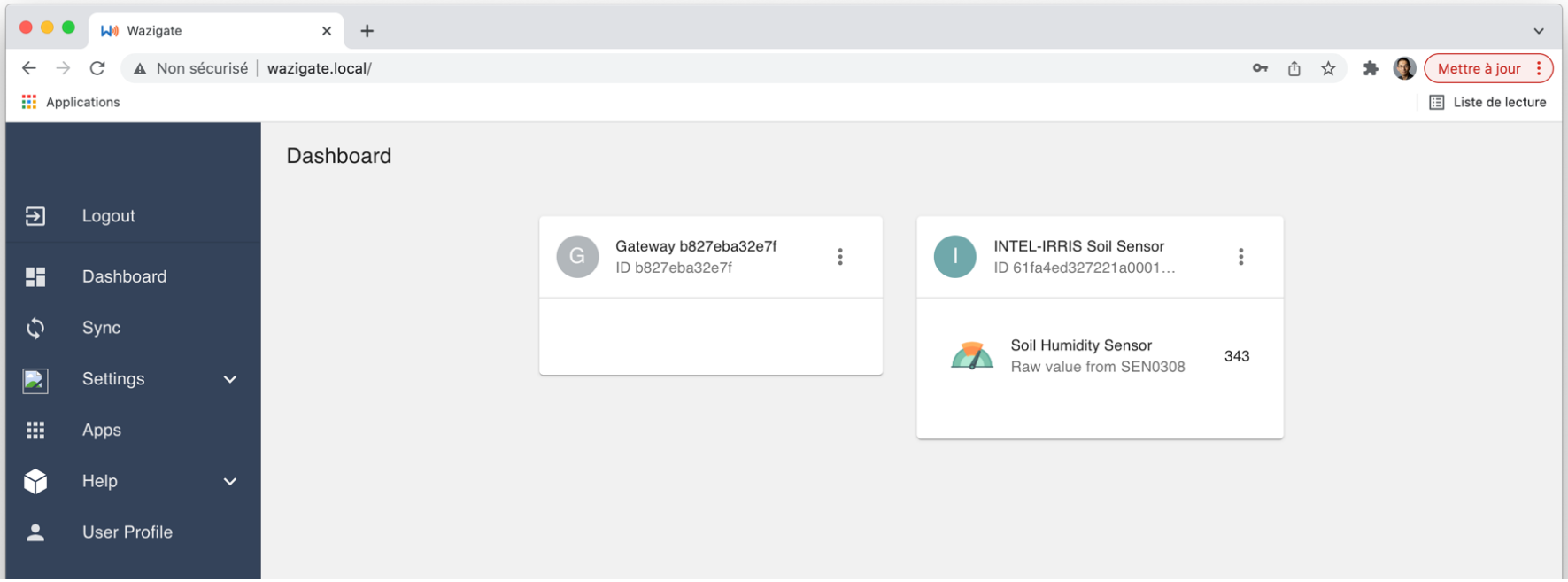
- Use default login to connect
  - User: admin
  - Password: loragateway

Change default password

- Once connected, it is recommended to change your password in the User Profile left menu



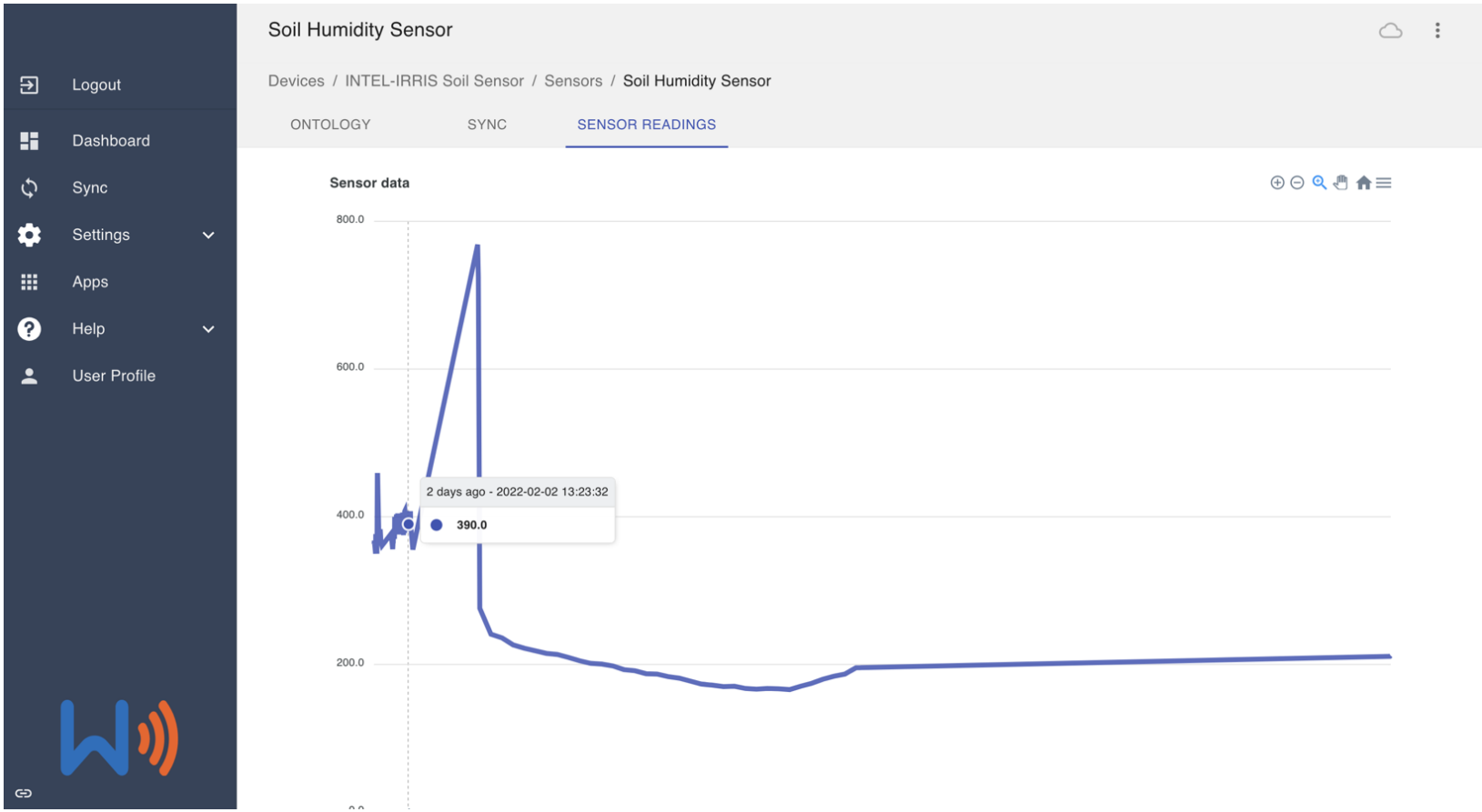
WaziGate dashboard



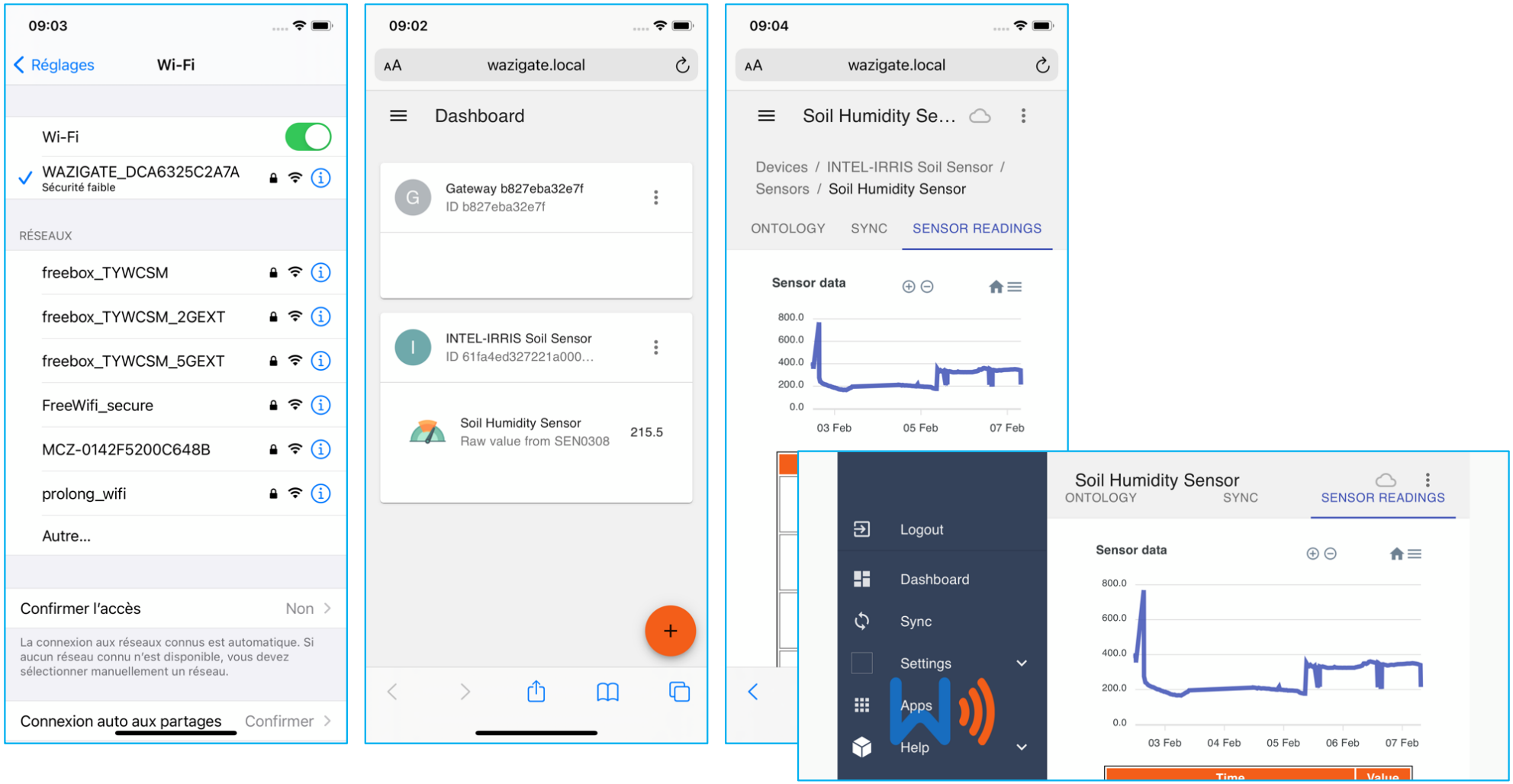
There is already a pre-configured INTEL-IRRIS soil sensor device with a SEN0308 soil humidity sensor ready to received data

The last received value is displayed in the device block

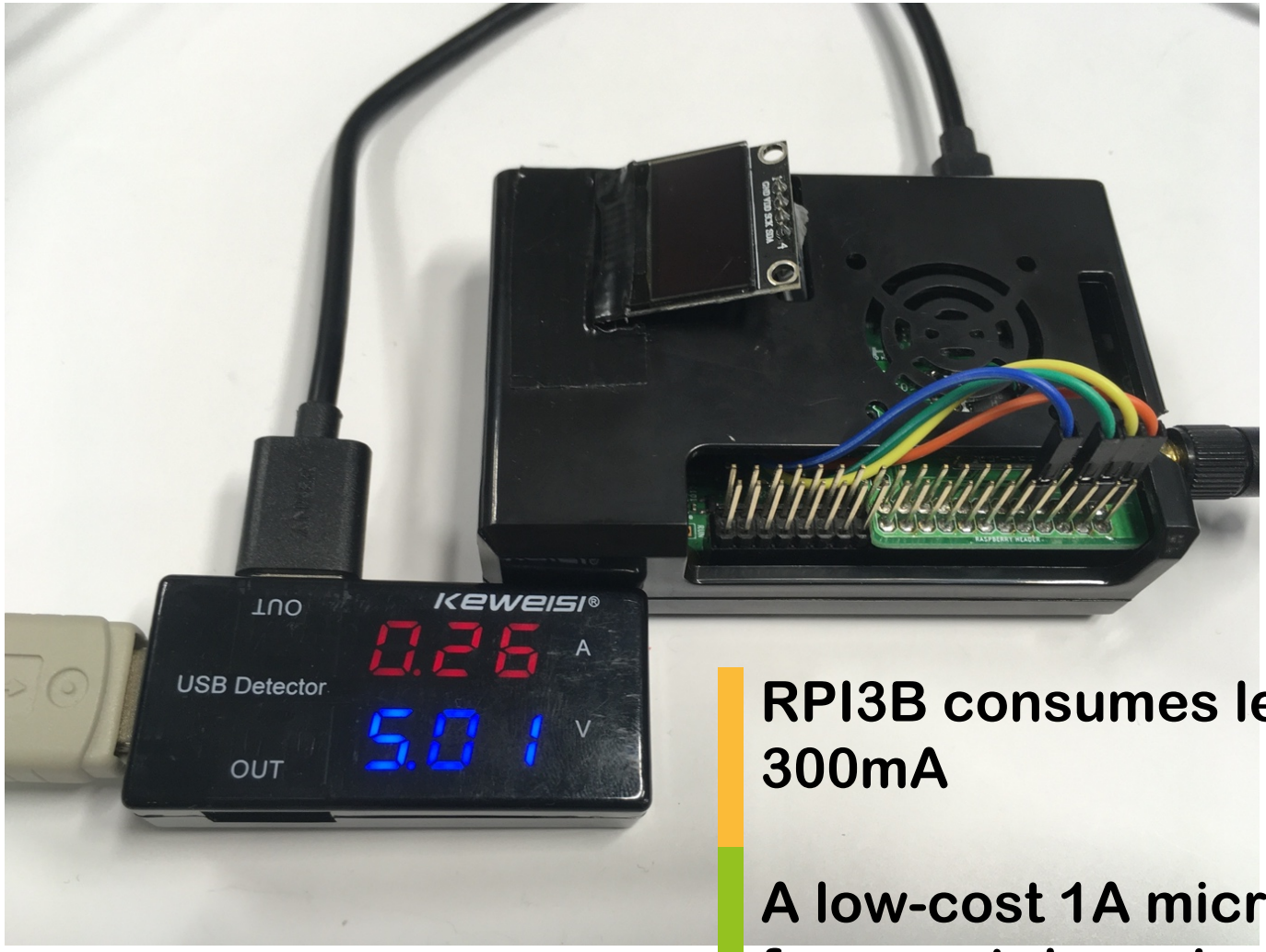
Display sensor data



All these steps with a smartphone



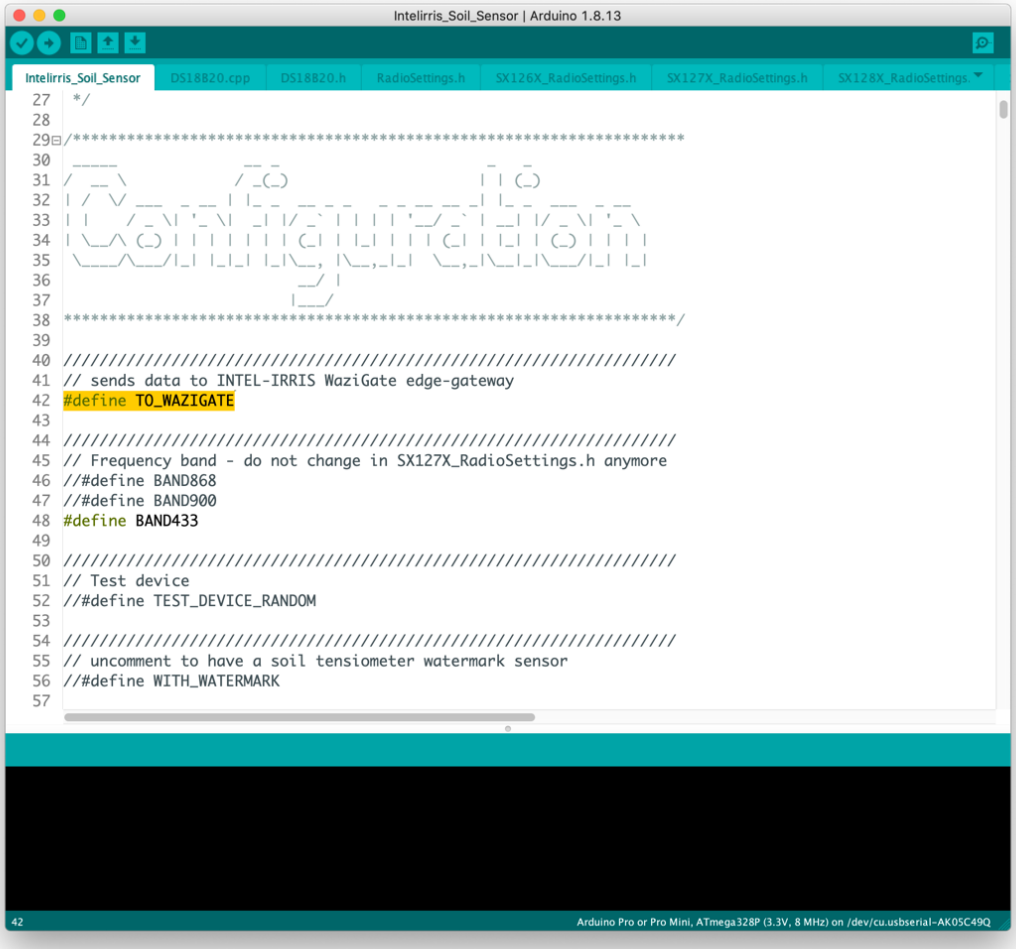
WaziGate power consumption



RPI3B consumes less than 300mA

A low-cost 1A micro USB charger for smartphone is suitable

Configure soil device for WaziGate

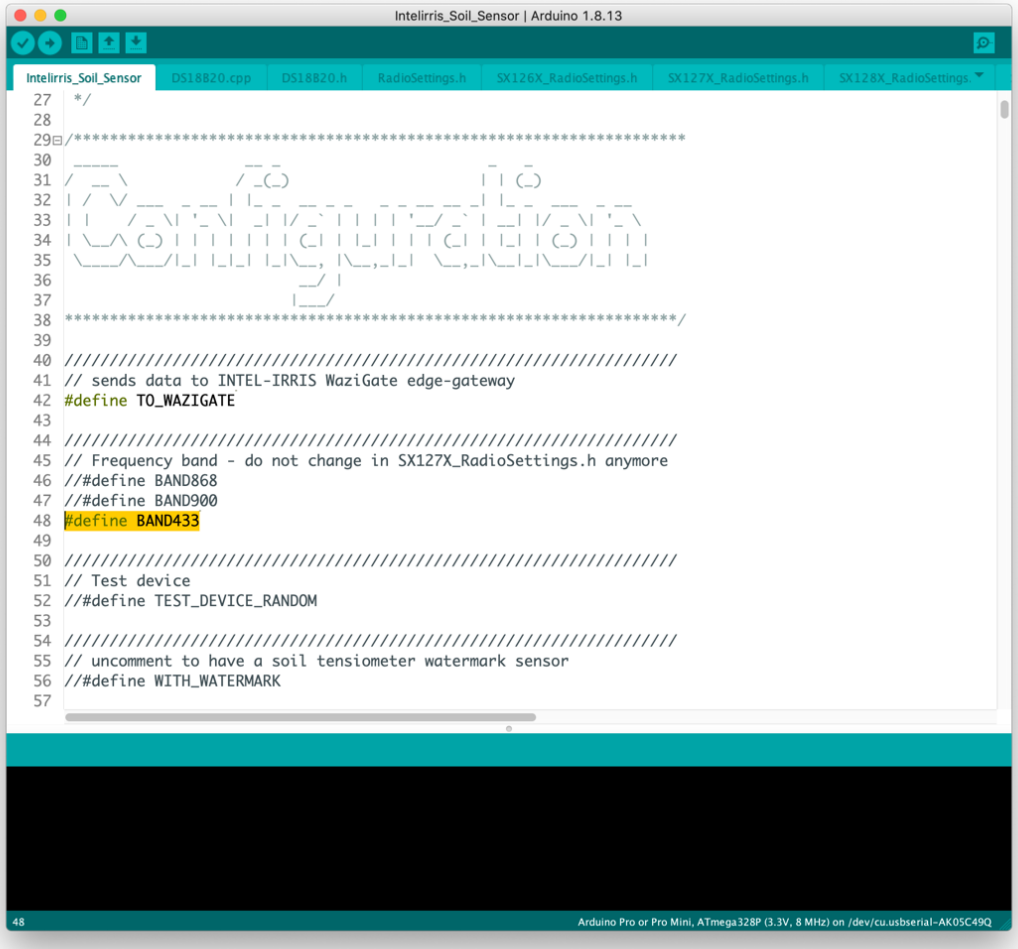


Be sure that

`#define TO_WAZIGATE`

is uncommented

Configuring for EU433 band



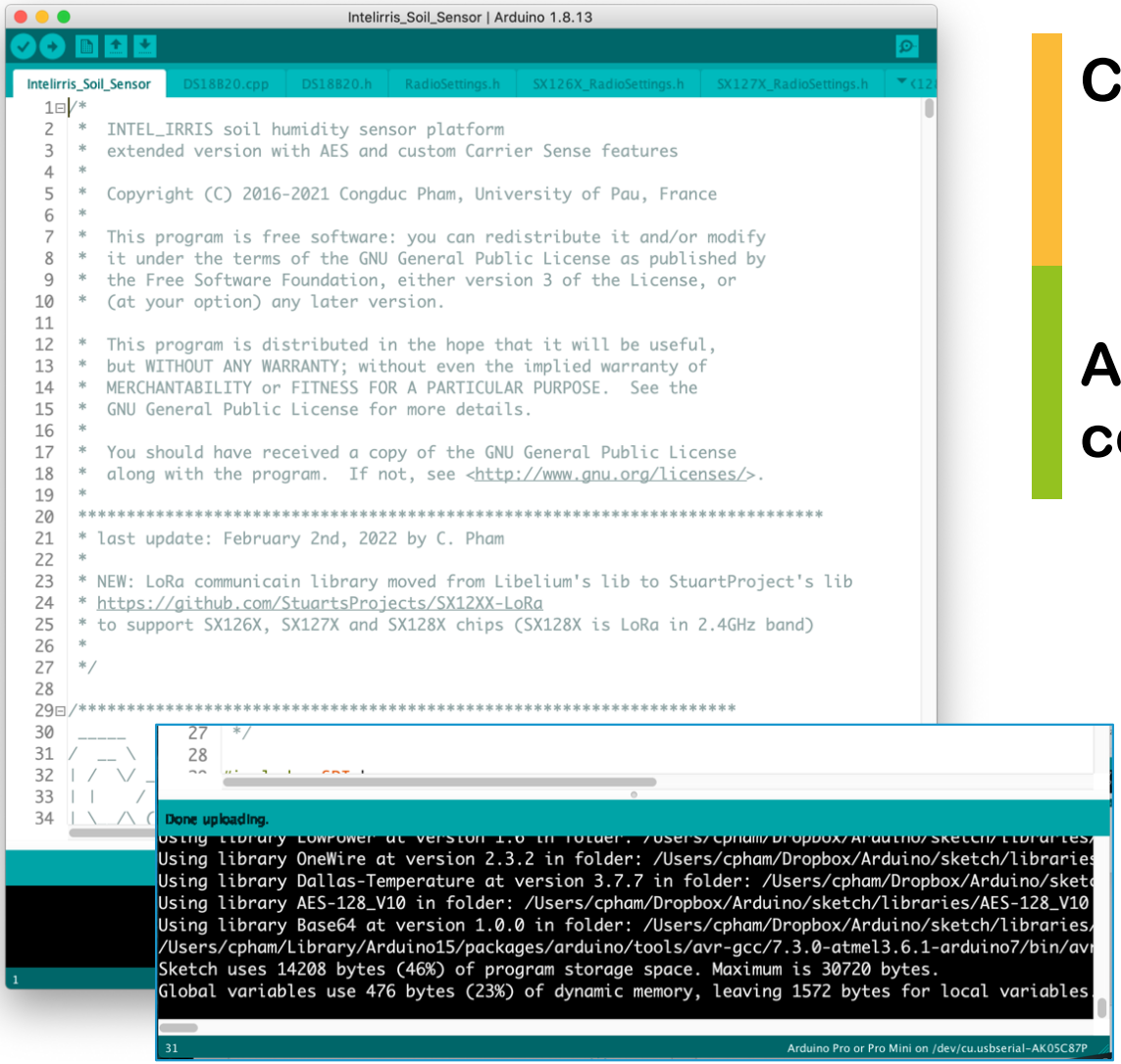
If you use the EU433 band

make sure that

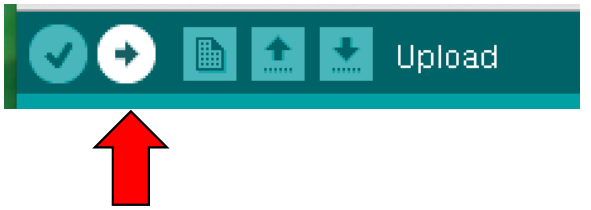
`#define BAND433`

is the only uncommented band option

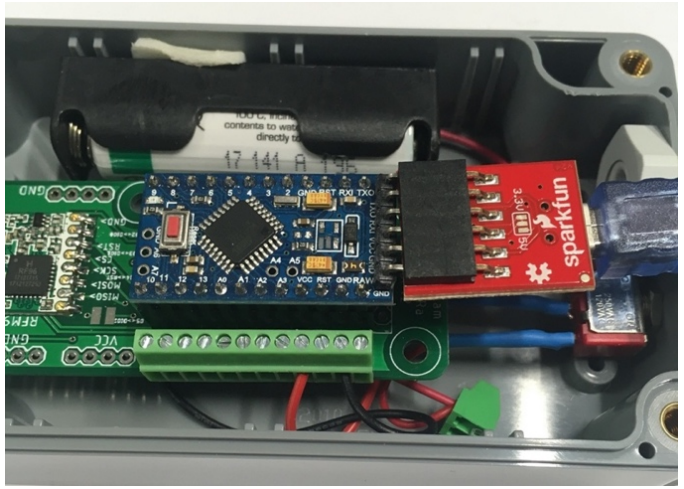
Uploading to your board



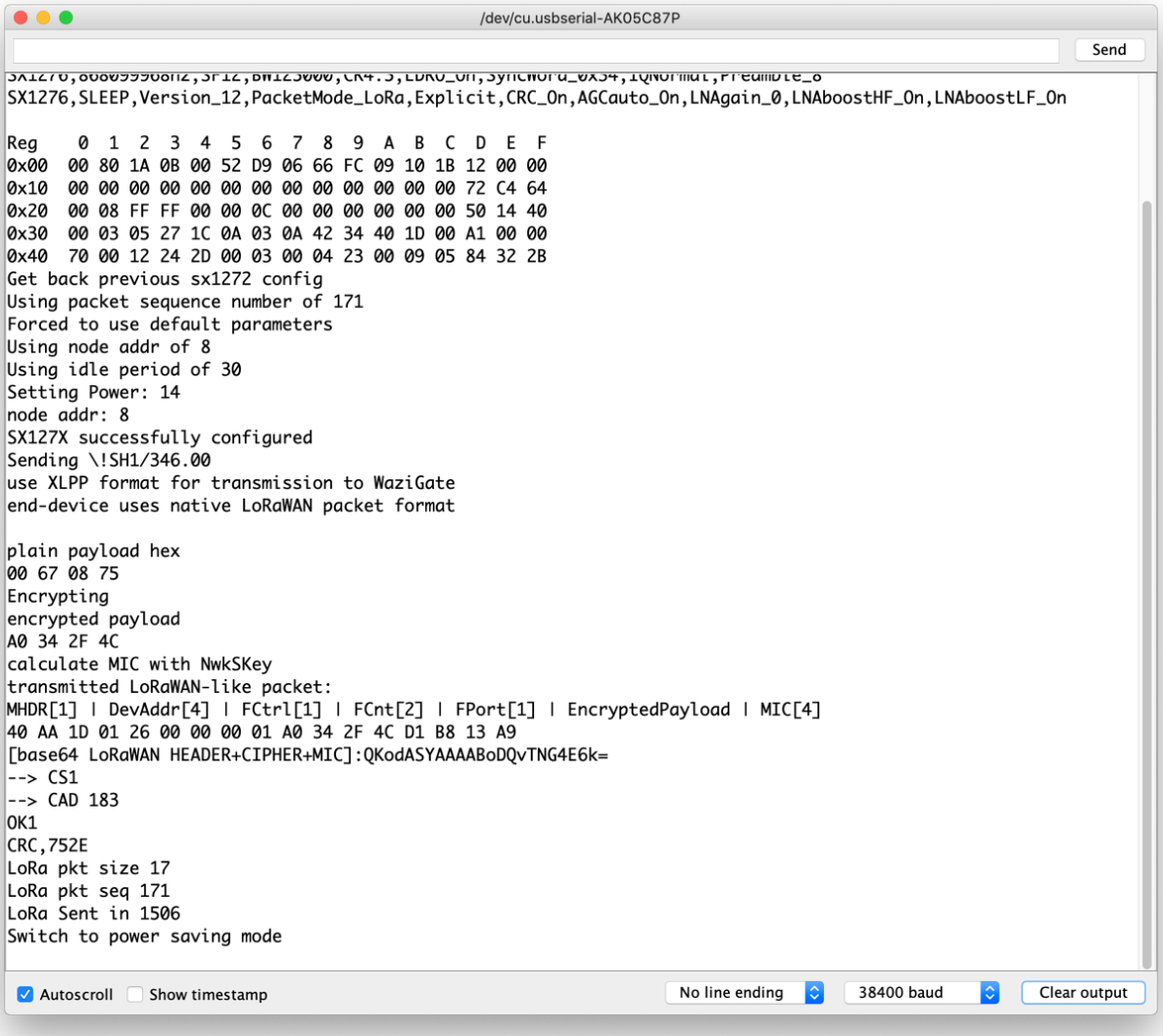
Click on the "upload" button



And wait until upload is completed



Checking that device is operational



- Open serial monitor
- Set baud rate to 38400
- See output from board
- Check that transmission is OK

Transmission to WaziGate

Parameters for
INTEL-IRRIS WaziGate

SF12BW125
868.1MHz | 433.175MHz
Node id is 26011DAA
1 msg/60mins
1 sensor
XLPP data

This dedicated video will show all these steps, from connecting the SEN0308 to testing transmission to the WaziGate
Video n°4: https://youtu.be/j-1Nk0tv0xM

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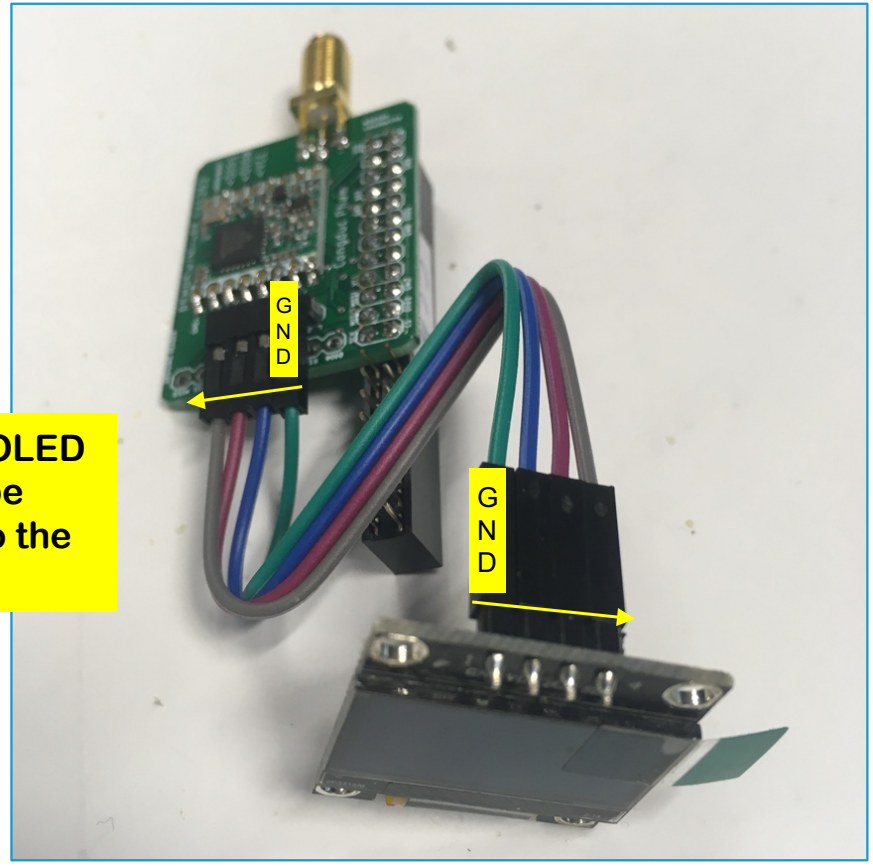
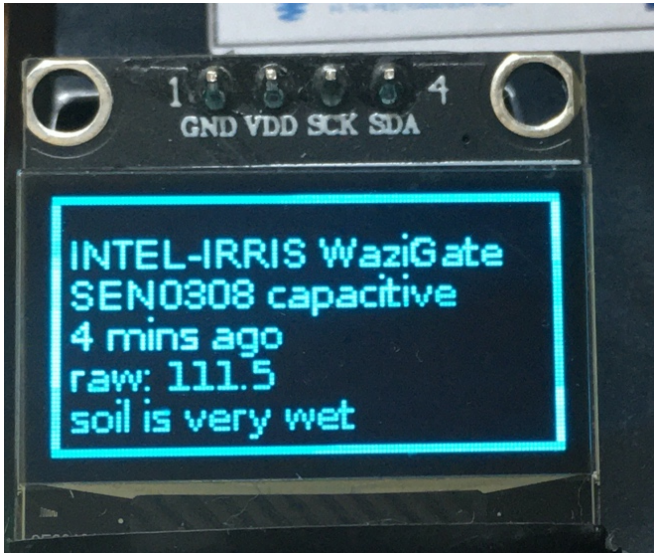
Installing an optional OLED

An optional OLED screen can be connected to the radio hat

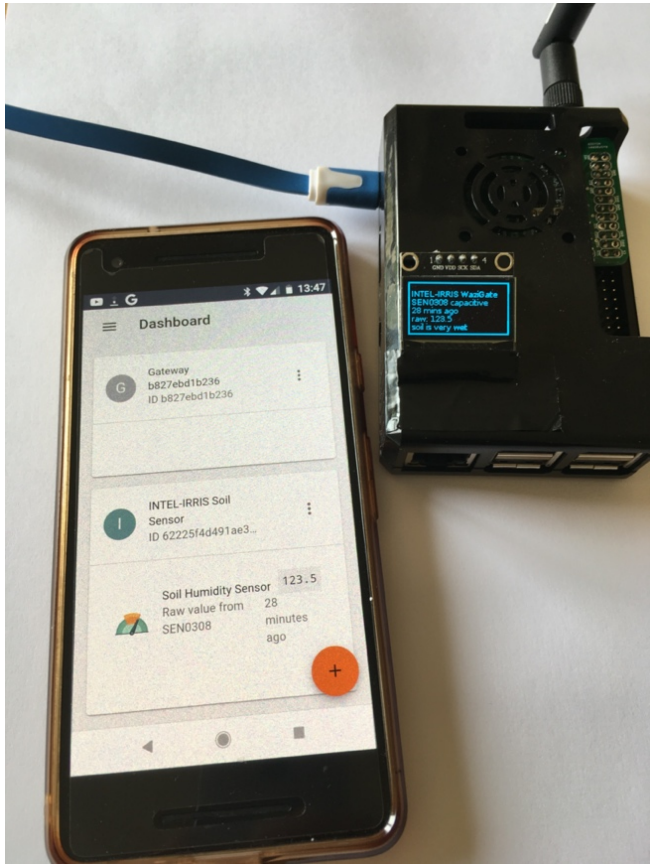


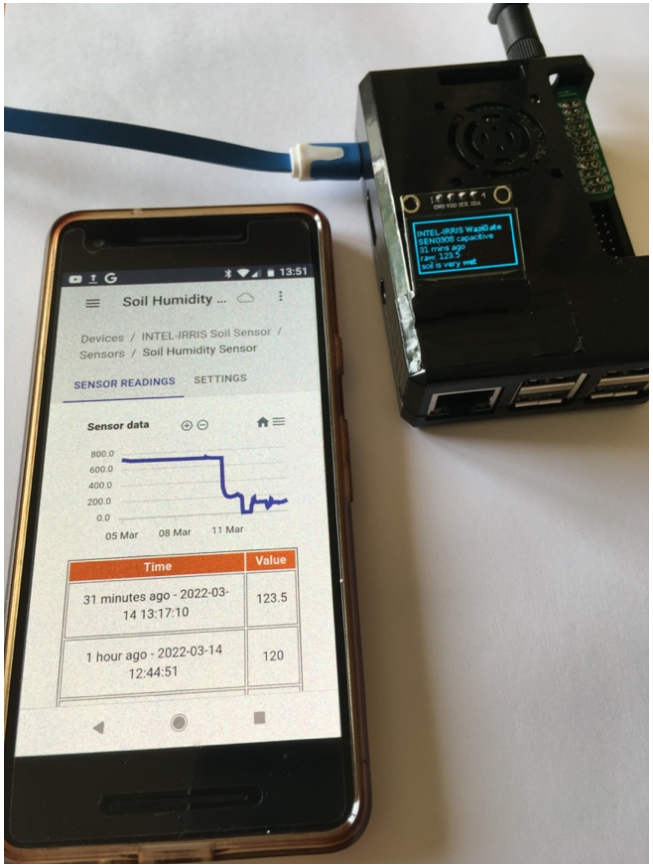
With the optional OLED

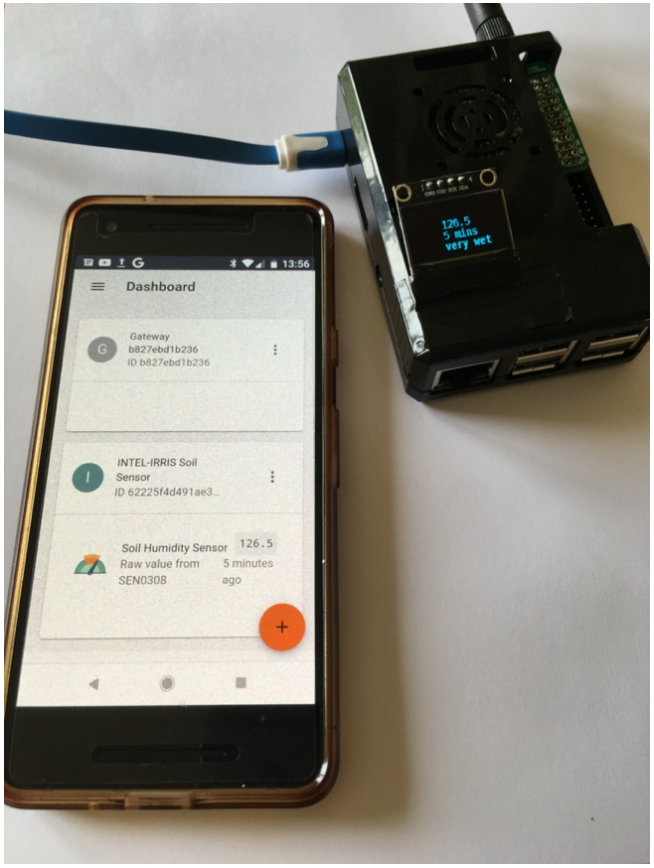
- With a small .96" OLED screen, information summary can be easily displayed for the end-user: the sensor type, the sensor raw value, the time of last received data and the soil condition
- The main screen is displayed for 6s every 2mins. Then a screen saver display will show a shorter version of these information



WaziGate User Interface







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