

Interaction is the key. Nothing exists alone in nature. Nothing survives alone in nature.  
There is no absolute division among the elements of the system.



Vuk Pavić, Mirko Jokić

# Development of Automatic Pest Trap Based on IoT (Internet of Things) Technologies

Banja Luka 19.05.2023.





## Project Goal

**To provide reliable and affordable remote pest monitoring device for most of BiH users.**



# First Prototype in 2018.

- Of-the-shelf components
- Missing battery charger, big energy consumption, no Deep Sleep mode etc.



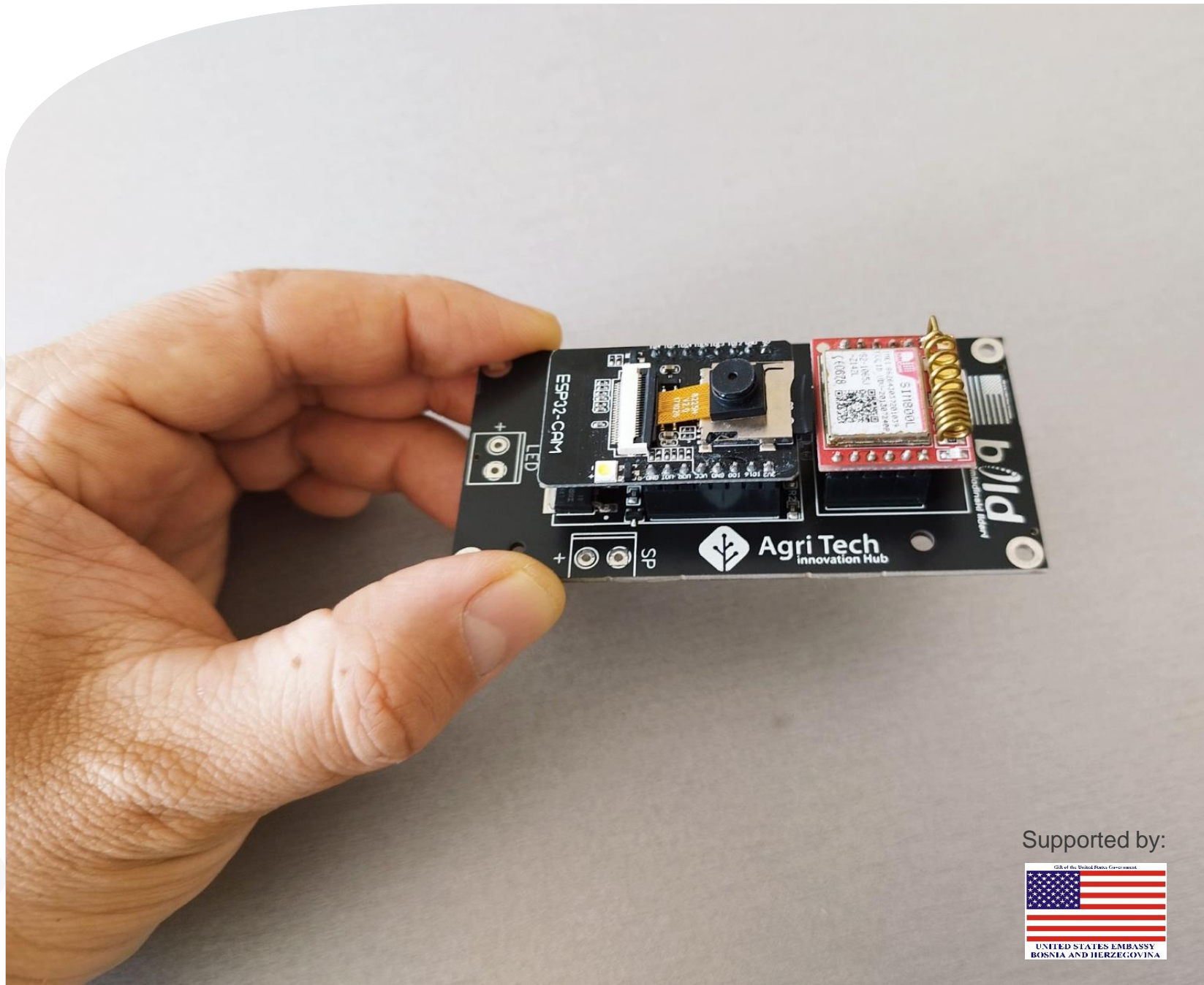
# First Prototype in 2018.





## Second Prototype in 2022.

- Customized Printed Circuit Board
- New modules:
  - Solar charger,
  - Voltage regulator,
  - Mosfets,
- GSM and WiFi enabled,
  - Deep Sleep enabled.
- Minor design issues.



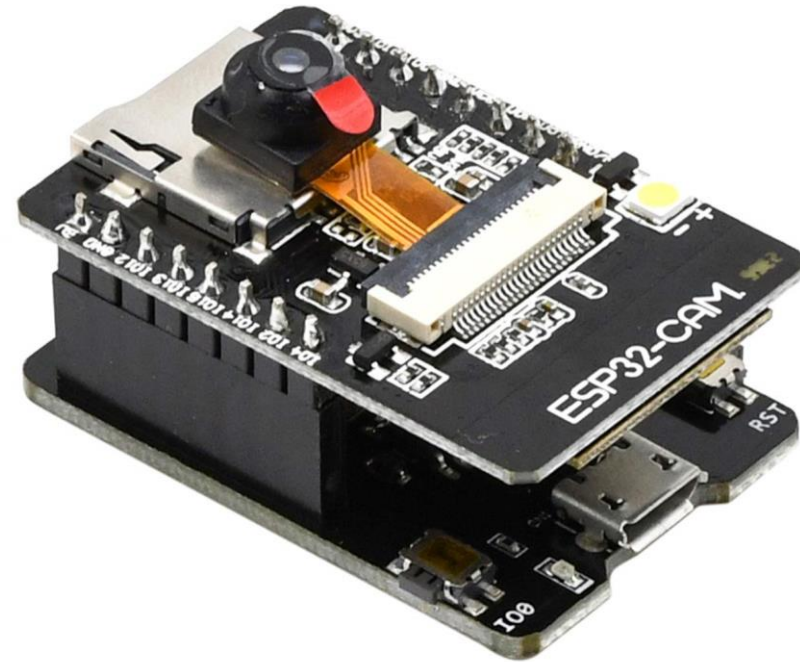
Supported by:



# ESP32-CAM

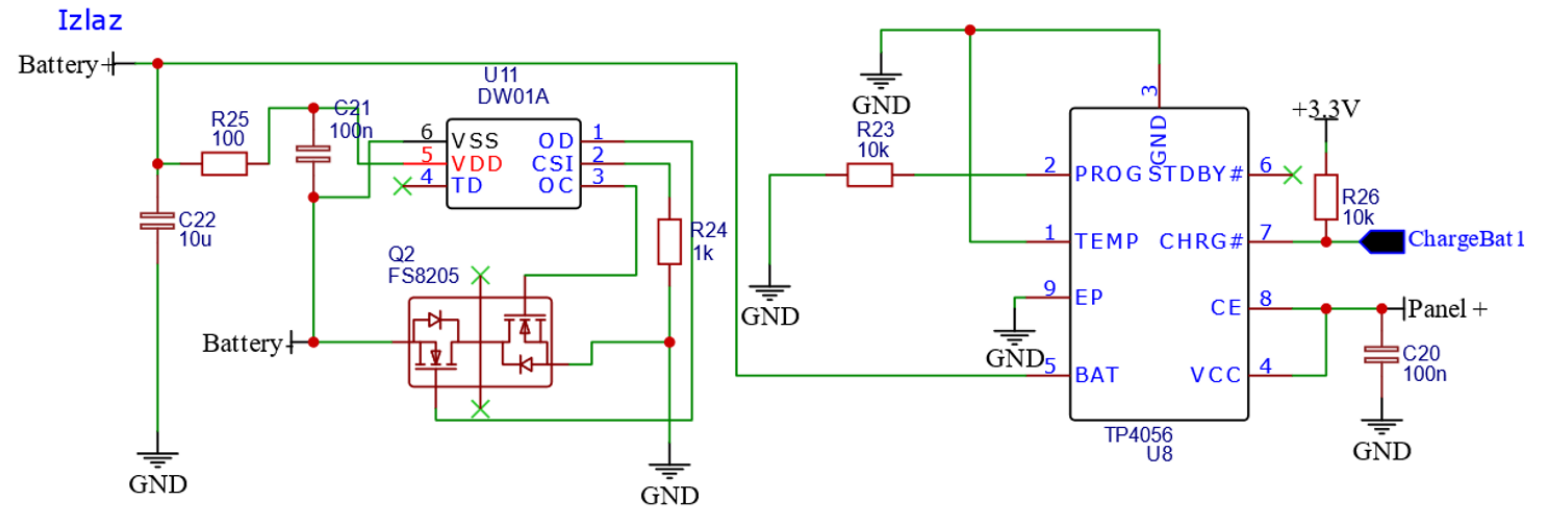
- Onboard ESP32-S module, supports WiFi + Bluetooth
- OV2640 camera with flash
- Onboard TF card slot, supports up to 16G TF card for data storage
- Supports WiFi video monitoring and WiFi image upload
- Supports multi sleep modes, deep sleep current as low as 6mA
- Control interface is accessible via pinheader, easy to be integrated and embedded into user products

! Microcontroller&Camera module.

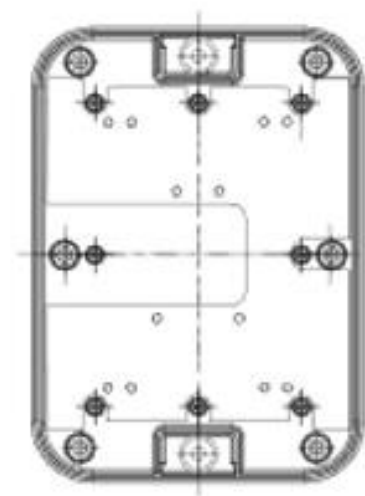
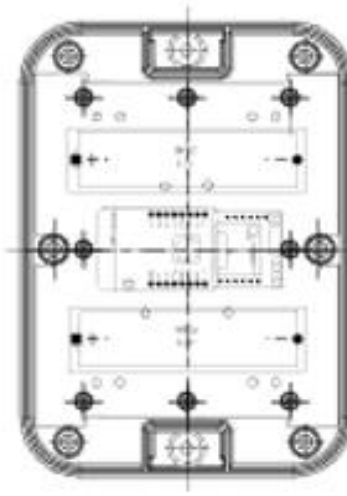
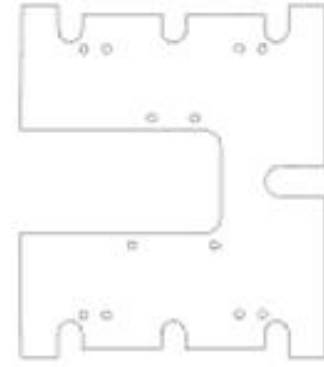
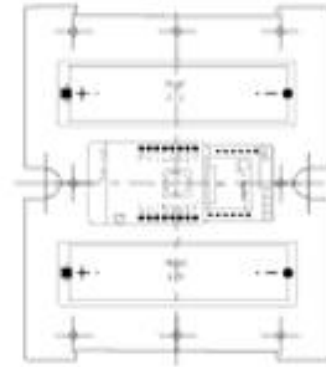
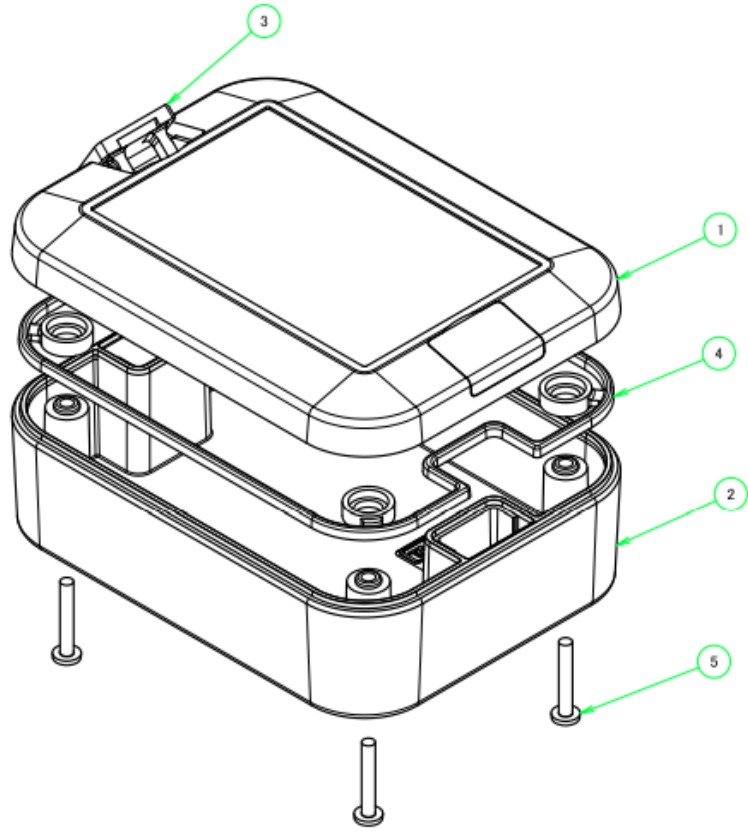


# PCB Schematic

- Solar Charger module;
- Power Line;
- Voltage Regulator;
- Headers;
- SIM module control;
- LED Panel control;
- Voltage monitor;
- Temp&RH Sensor

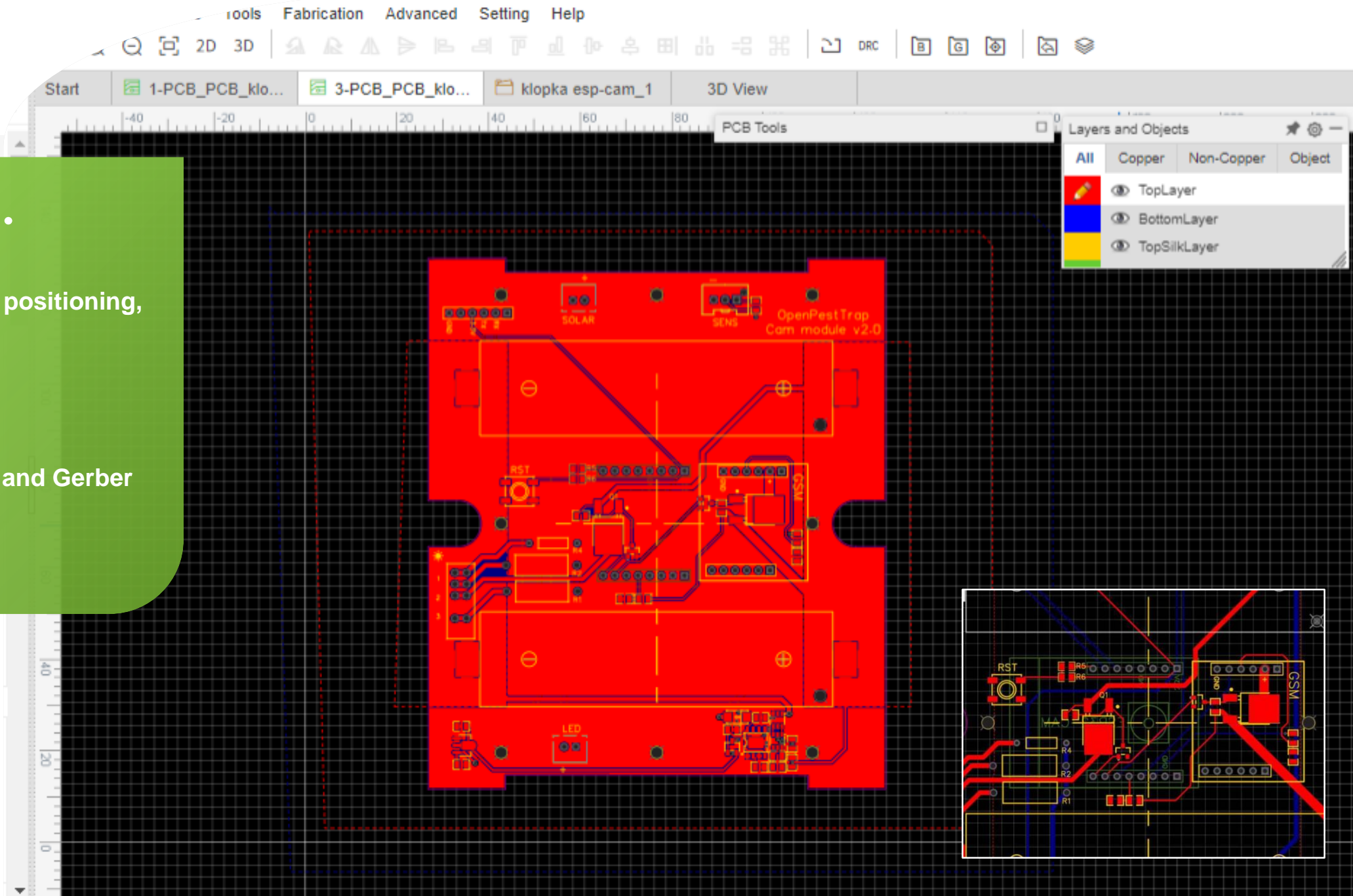


# Enclosure

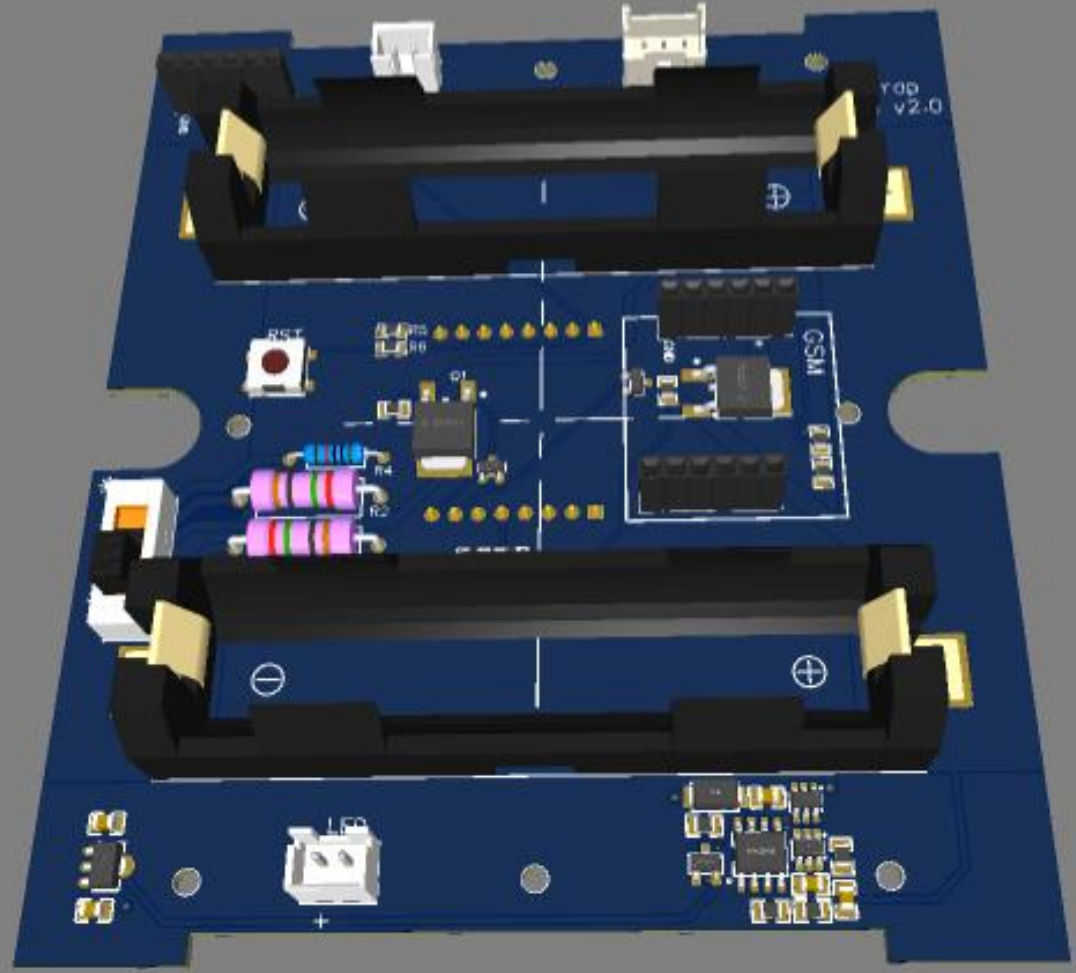


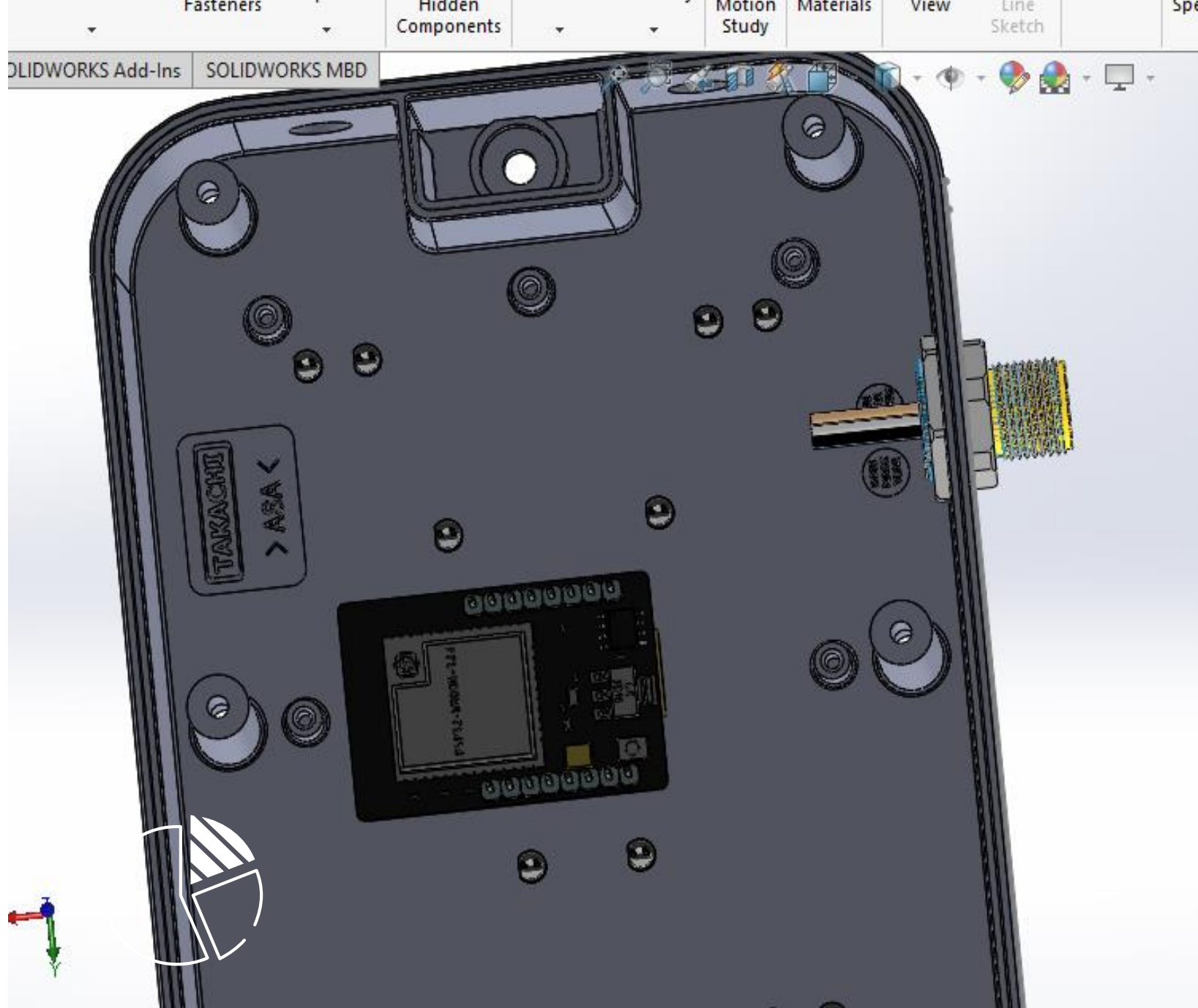
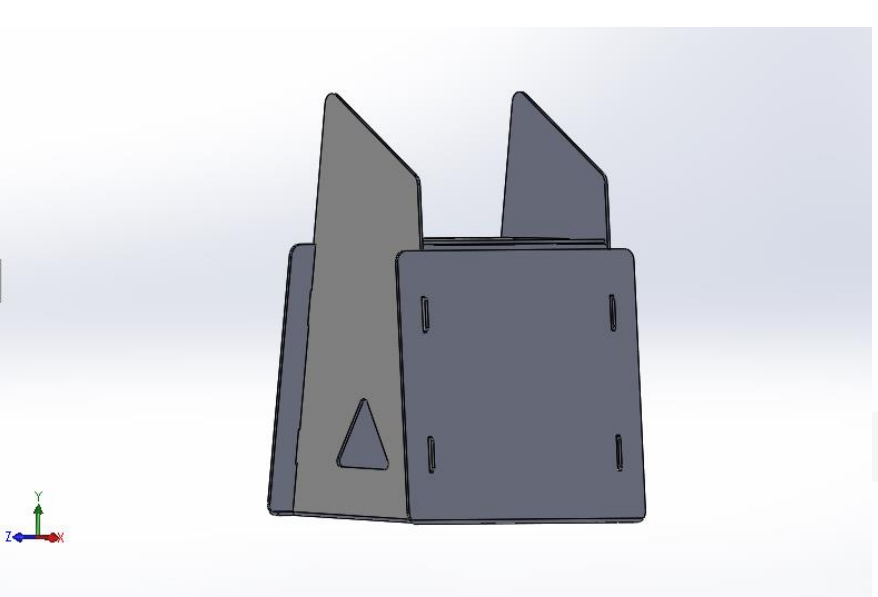
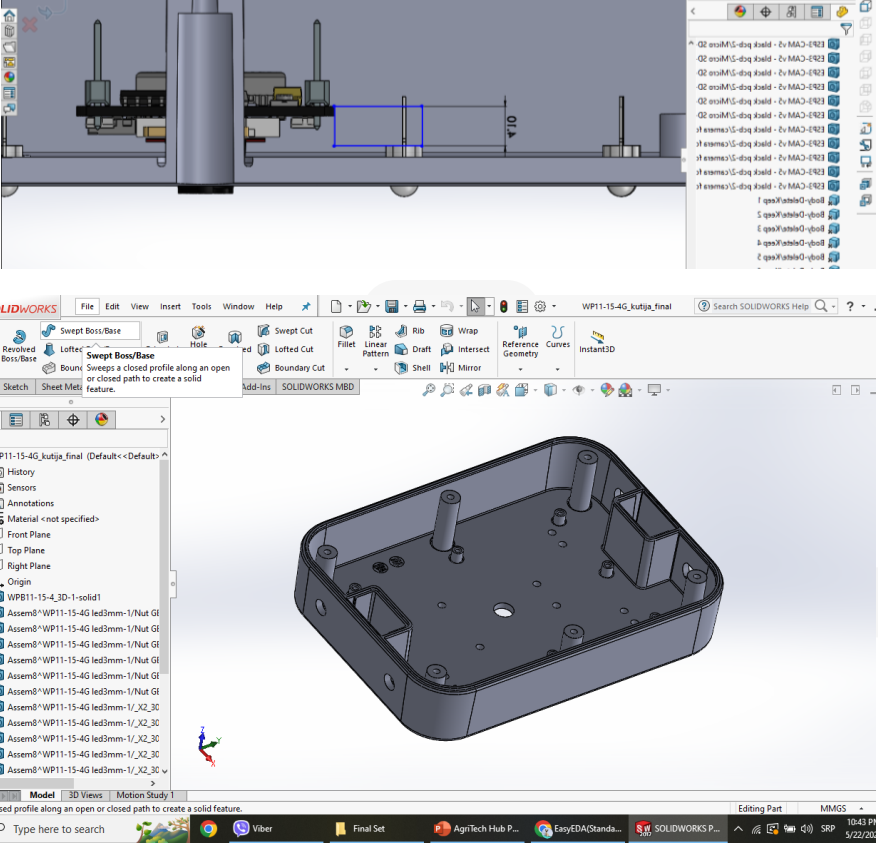


- • •
- ✓ Components positioning,
- ✓ Layering,
- ✓ Routing;
- ✓ Making BOM and Gerber file...

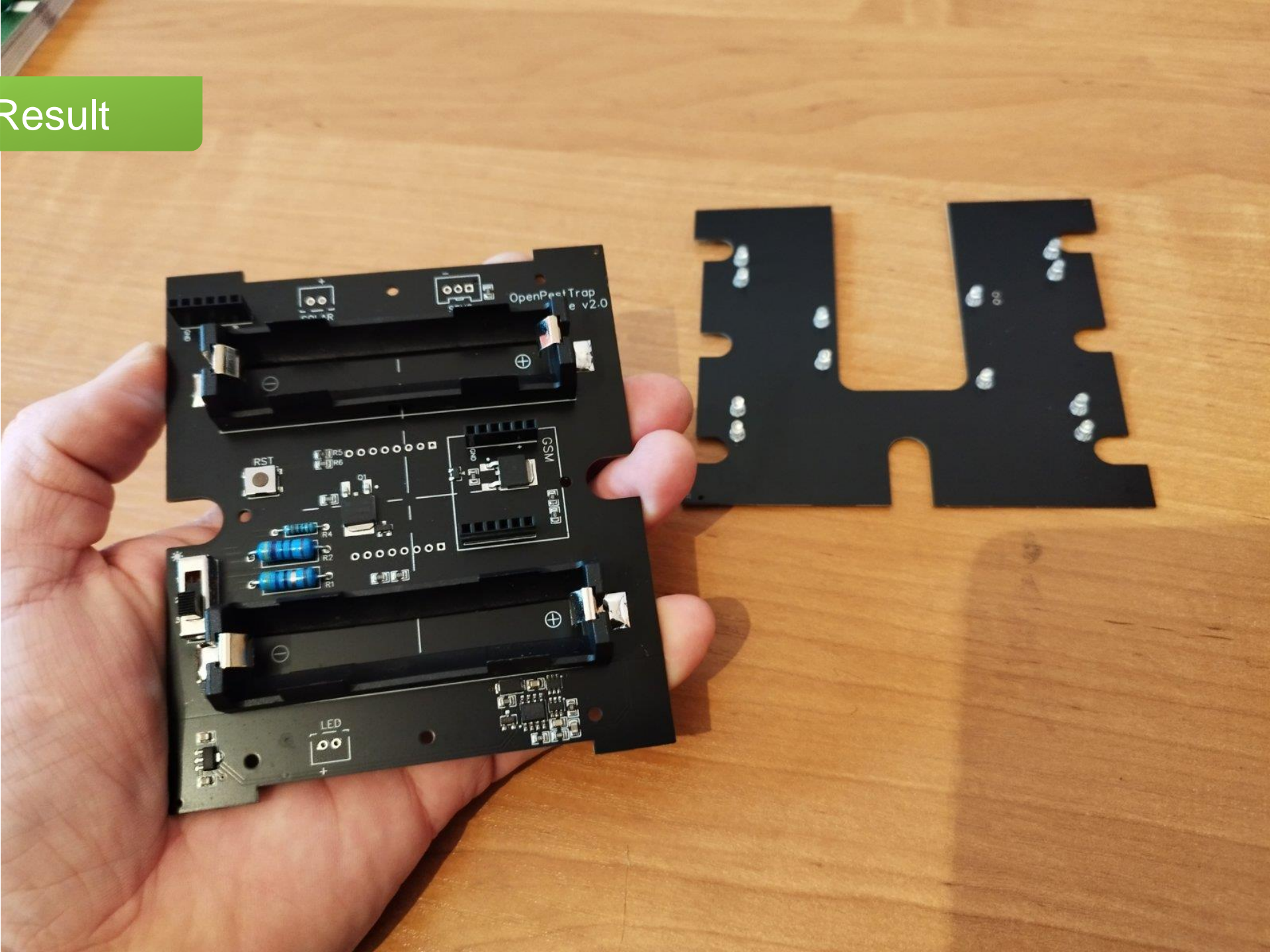


☑ 3D Model



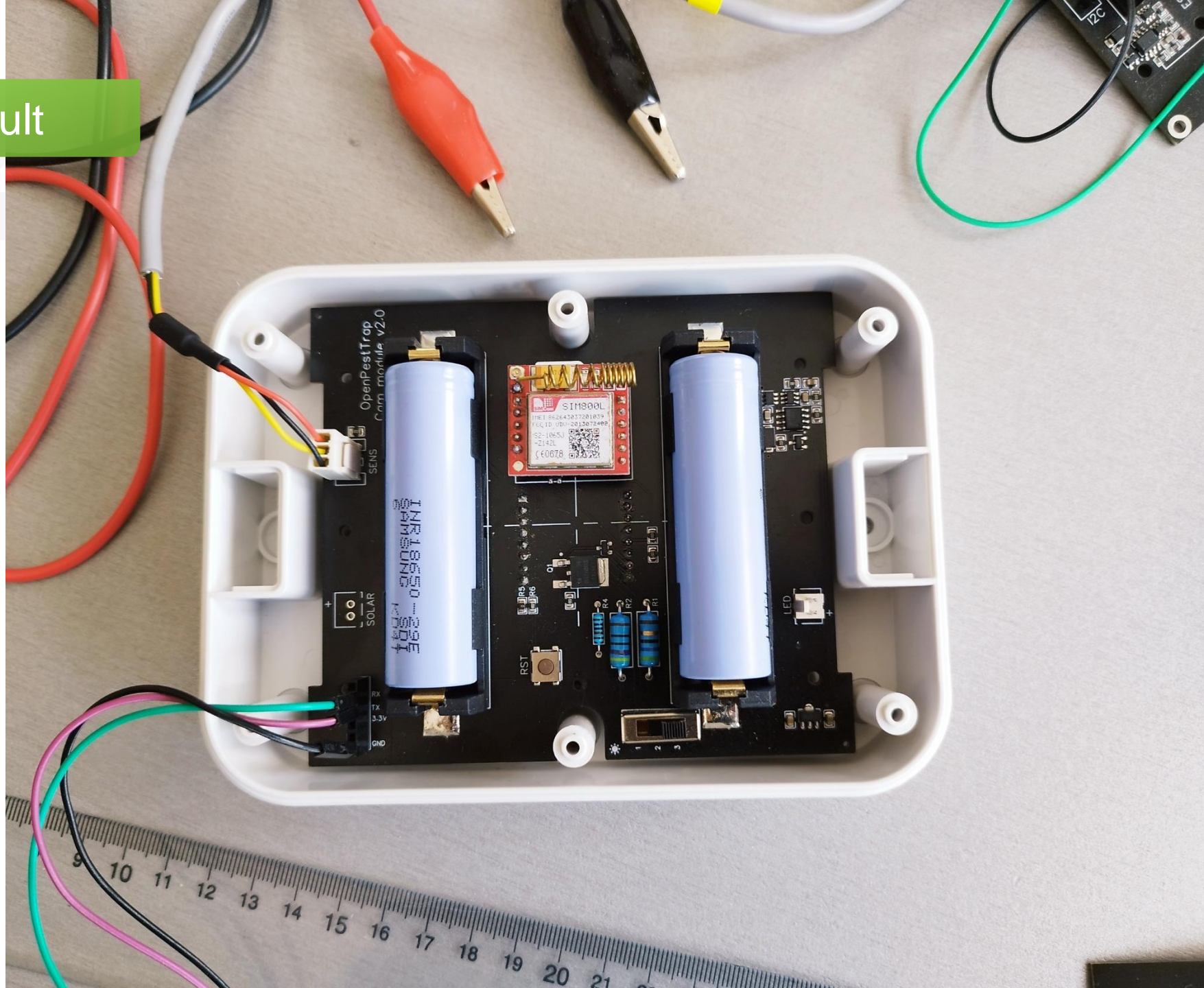


# Result



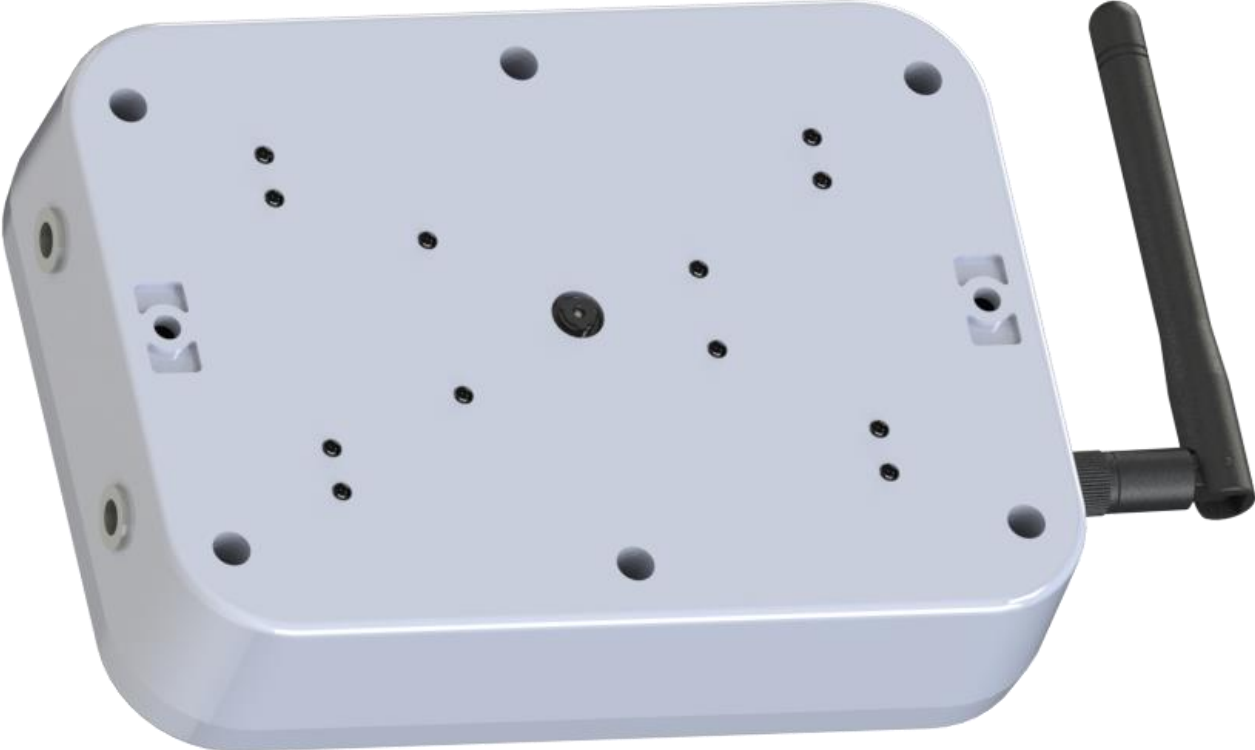


# Result



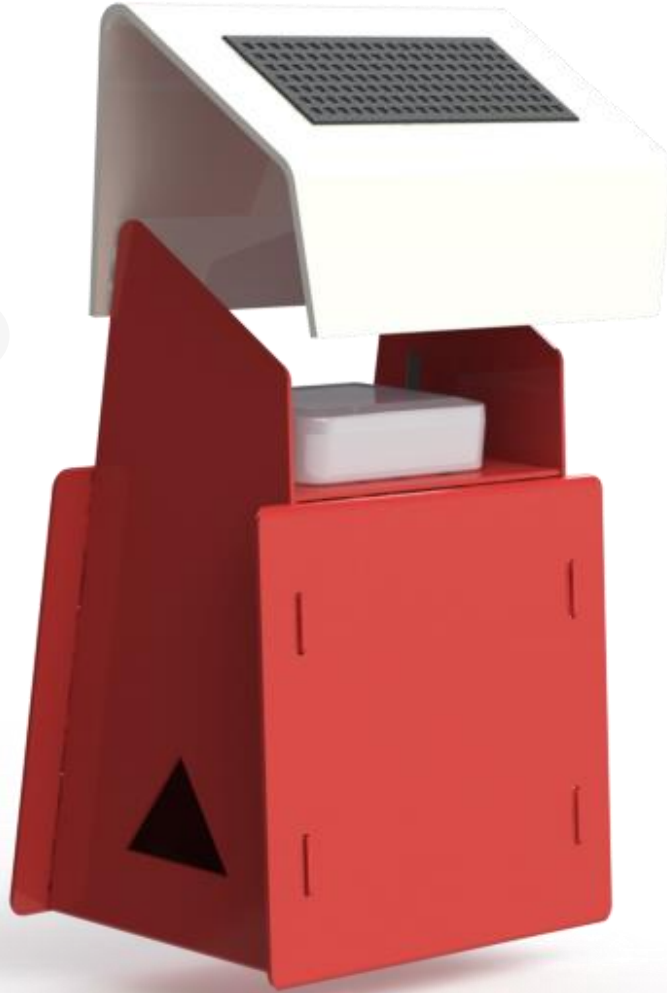


# Device final look

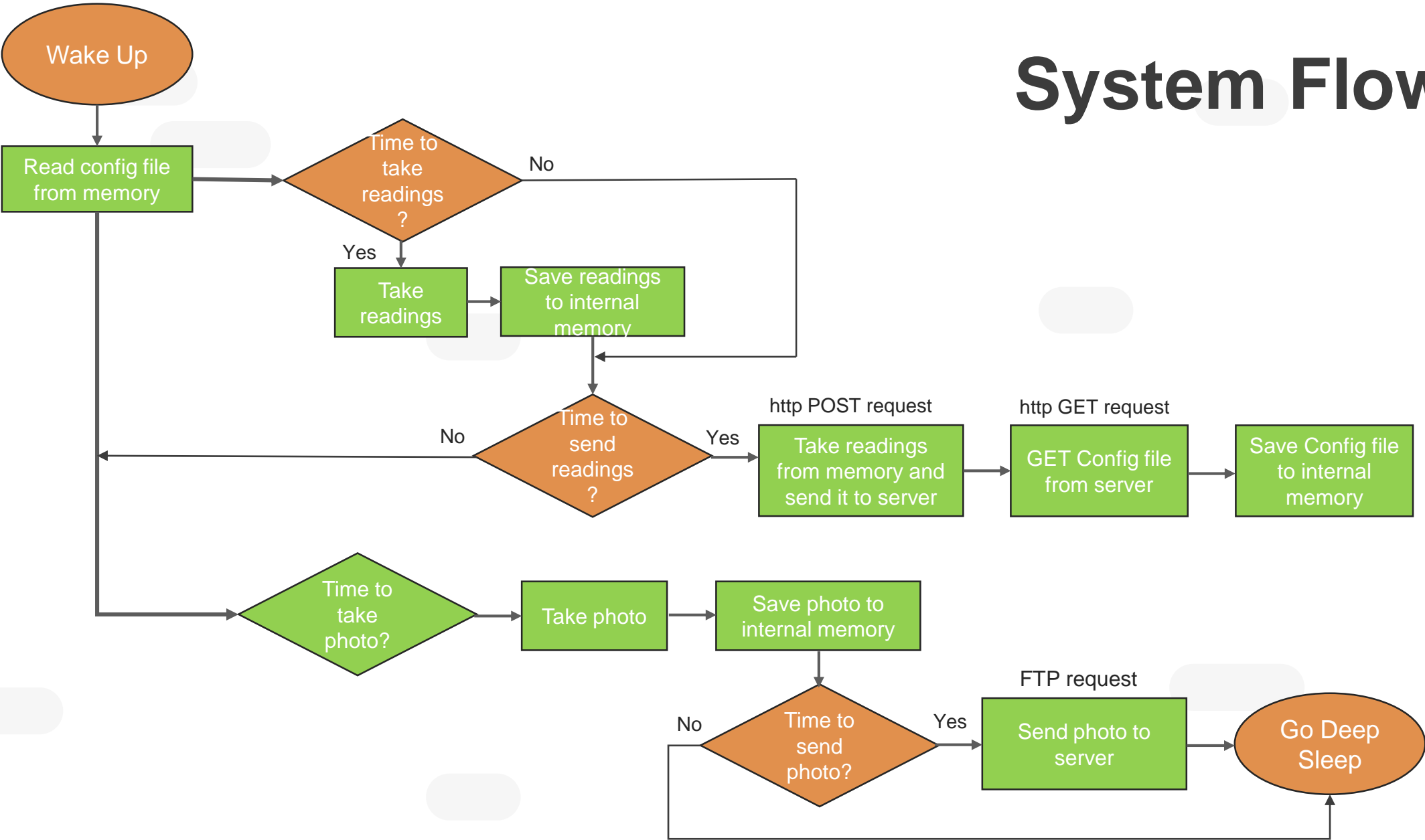




Trap Final Look (render)

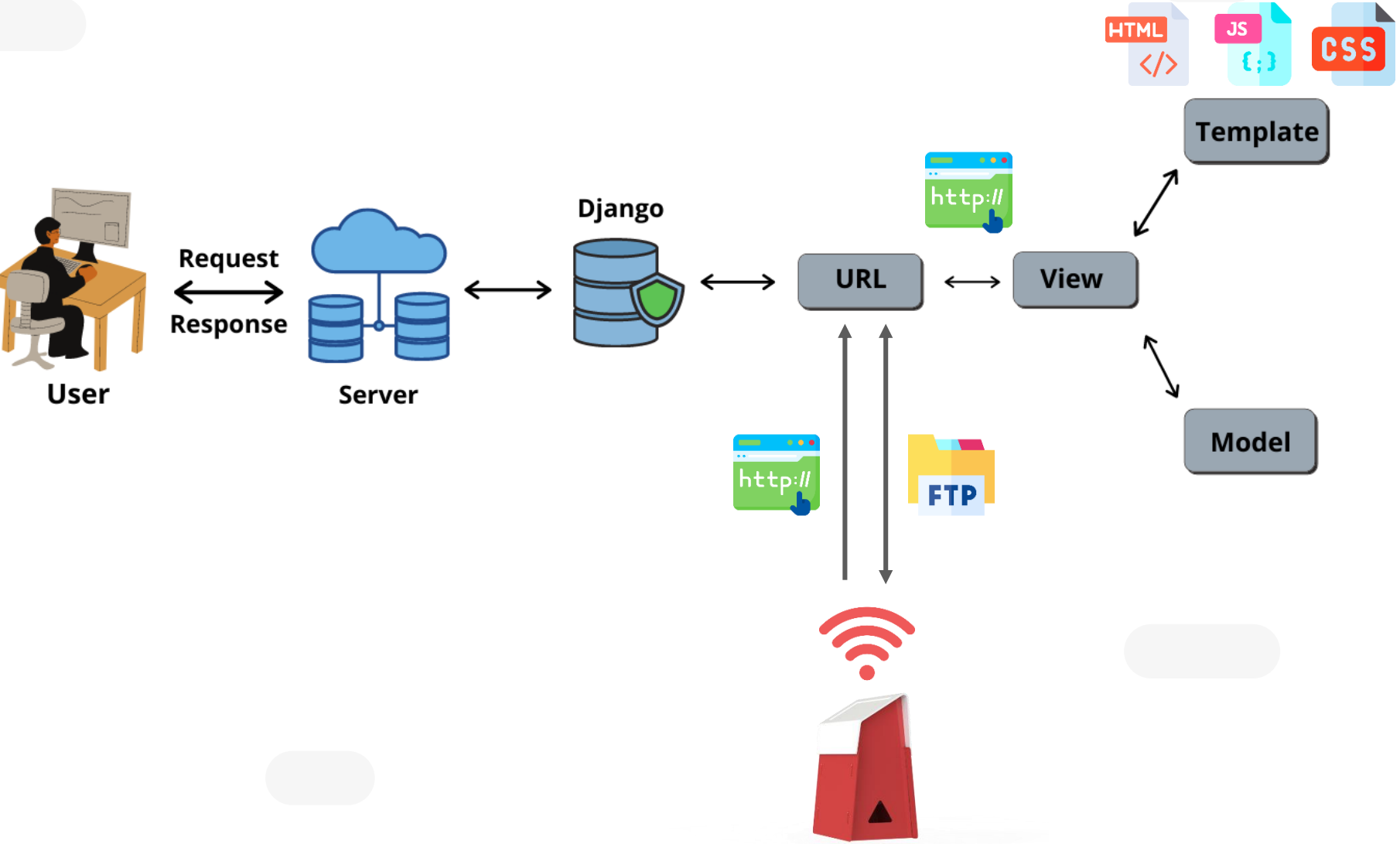


# System Flow



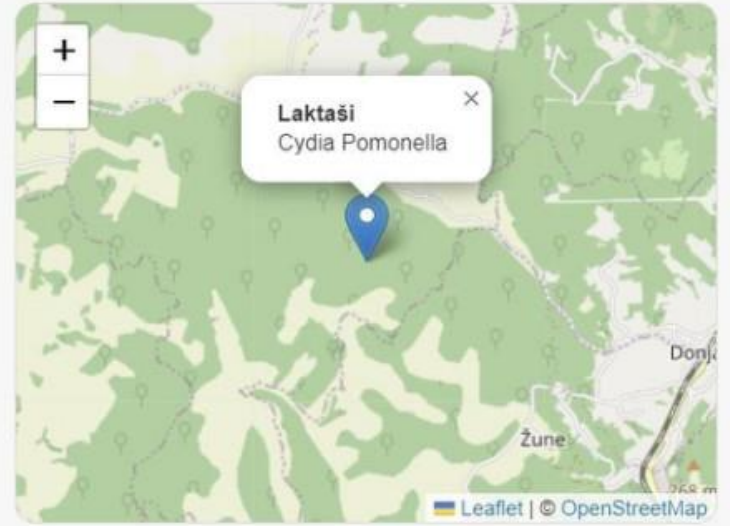
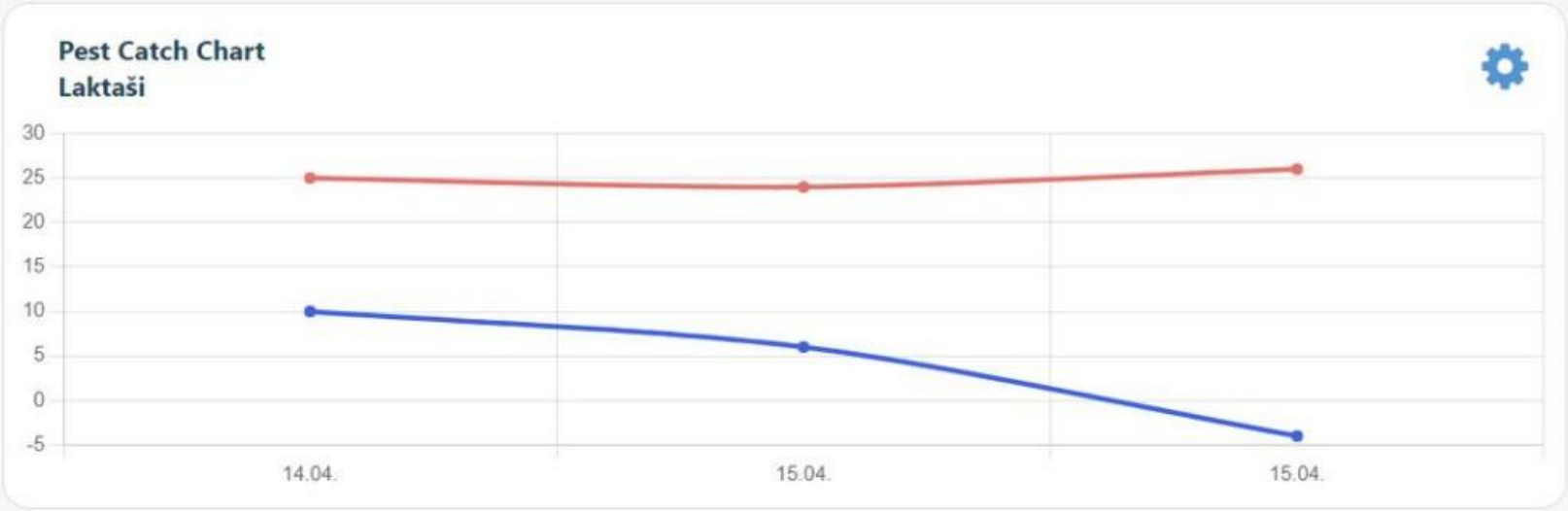


# System architecture





# Web App



### My Traps

Trap ID	Name	Catch	Pest	Battery	Signal Strength	Last Communication	Inspect
0001	Laktaši		Cydia Pomonella			16-04-2023 21:56	Inspect

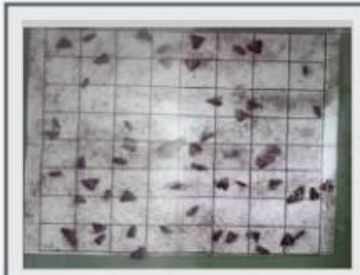
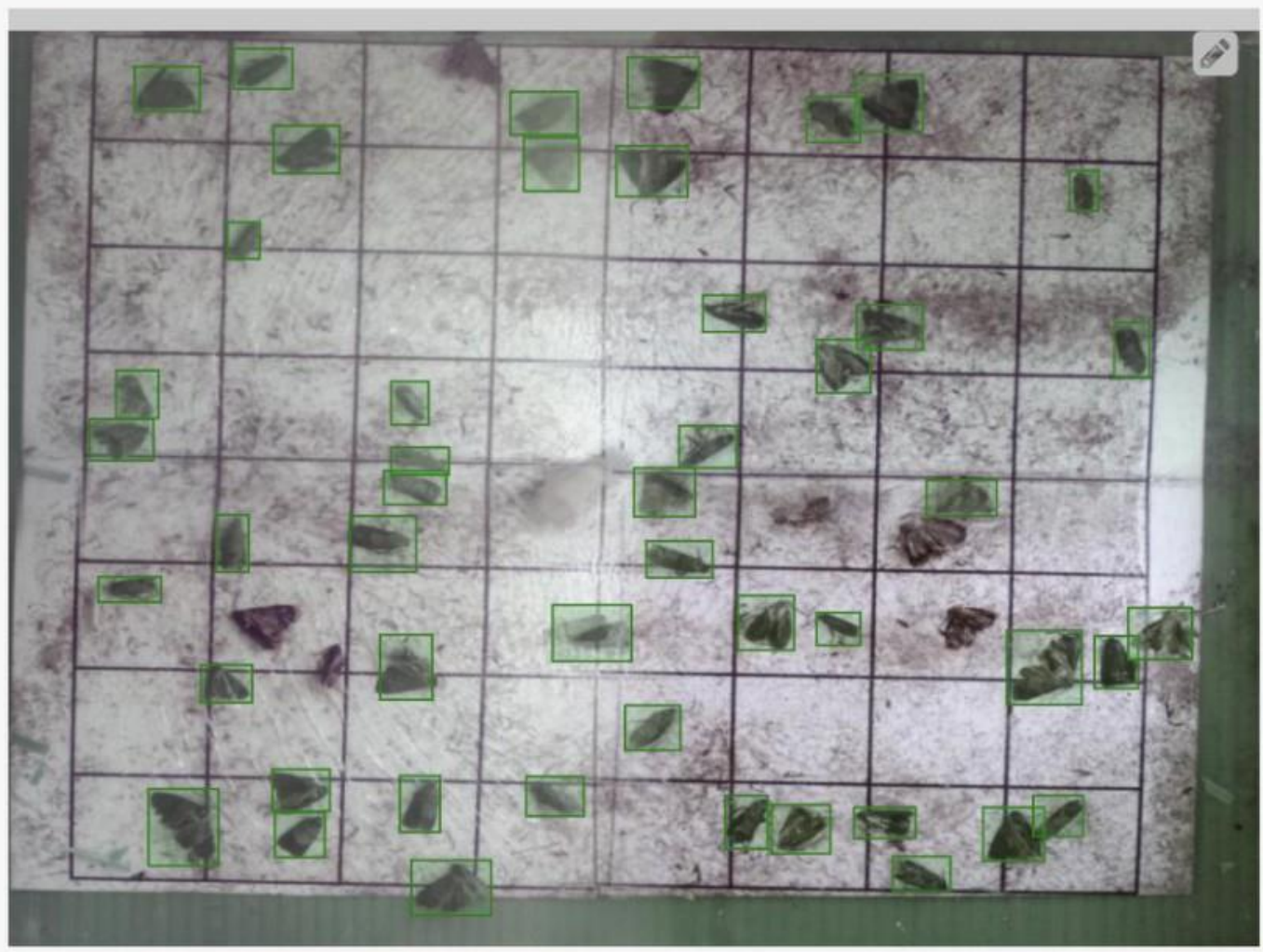


# Trap

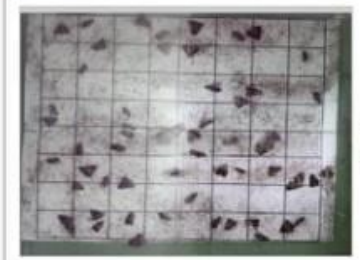


0001 Laktaši

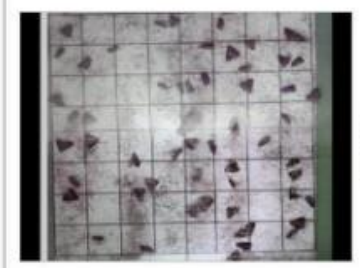
Cydia Pomonella



April 15, 2023, 9:57 p.m.



April 15, 2023, 8:58 p.m.



April 14, 2023, 6:49 p.m.

# Conclusion

- Prototype is currently on **Technology Readines Level of 4** – Prototype validated in laboratory environment. **All components are on high integration level;**
- Initial tests in relevant environment are done but more testing is required in order to **prove product robustness;**
- Housing fabrication is in progress;
- Web App concept proven. Work is in progress;
- **Promissing results on initial AI insect detection** are achieved: short model training time, **precision of 0,67** on 100 images data set.

# Our Team



**Vuk Pavić**



**Jelena Matijaš**



**Mirko Jokić**



*“Once a new technology rolls over you,  
if you're not part of the steamroller,  
you're part of the road.”*

Steward Brand

