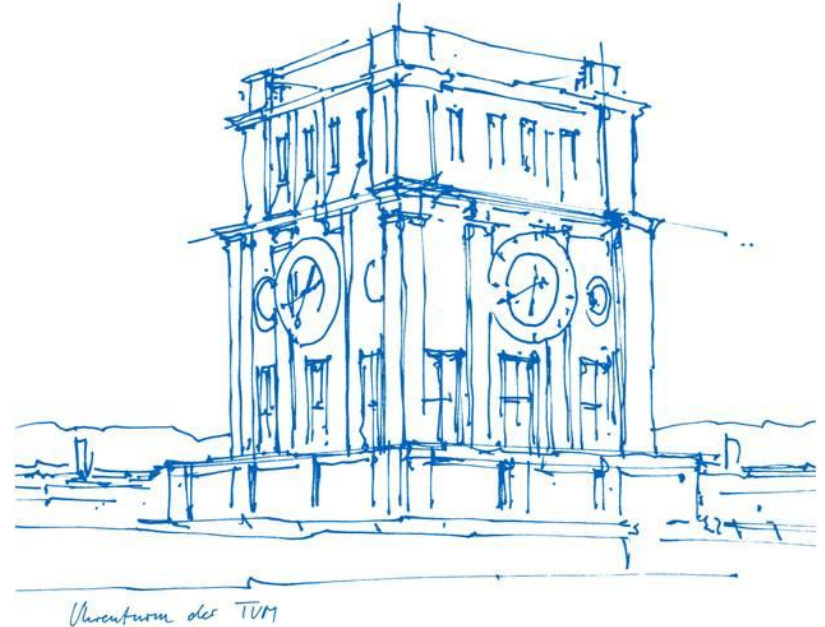


Mobile Solar Panels

Interim Demo

Eric Armbruster, Florian Freund, Sebastian Klinke

Garching, 24.06.2022



Motivation

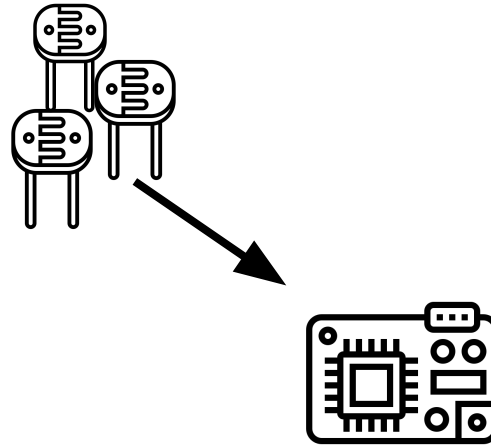
- Optimal usage
- No manual adjustments
- No dependency on mobile vehicle location and angle
- location, orientation, tilt, date optional
- Internet optional



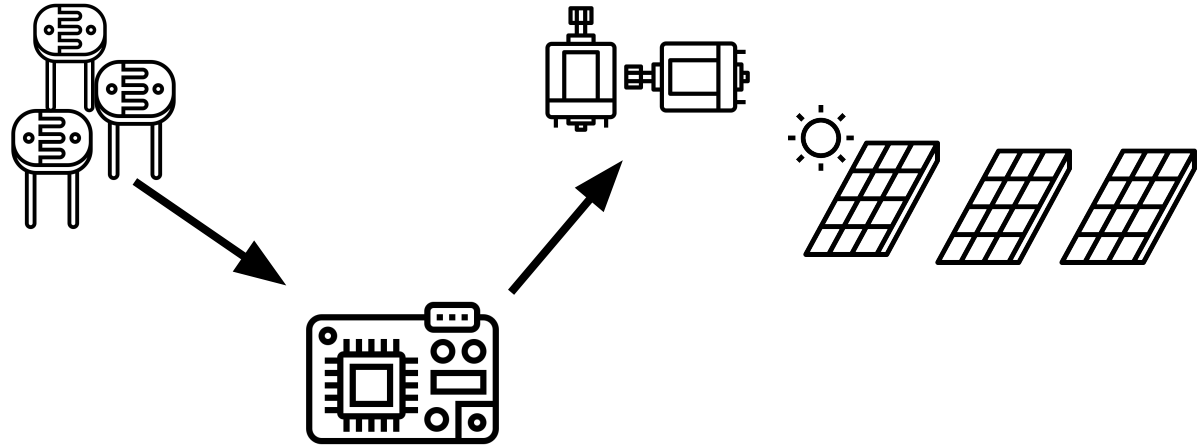
Source:
<https://www.istockphoto.com/de/foto/tragbare-solar-panels-gm676339804-124095973>

Setup

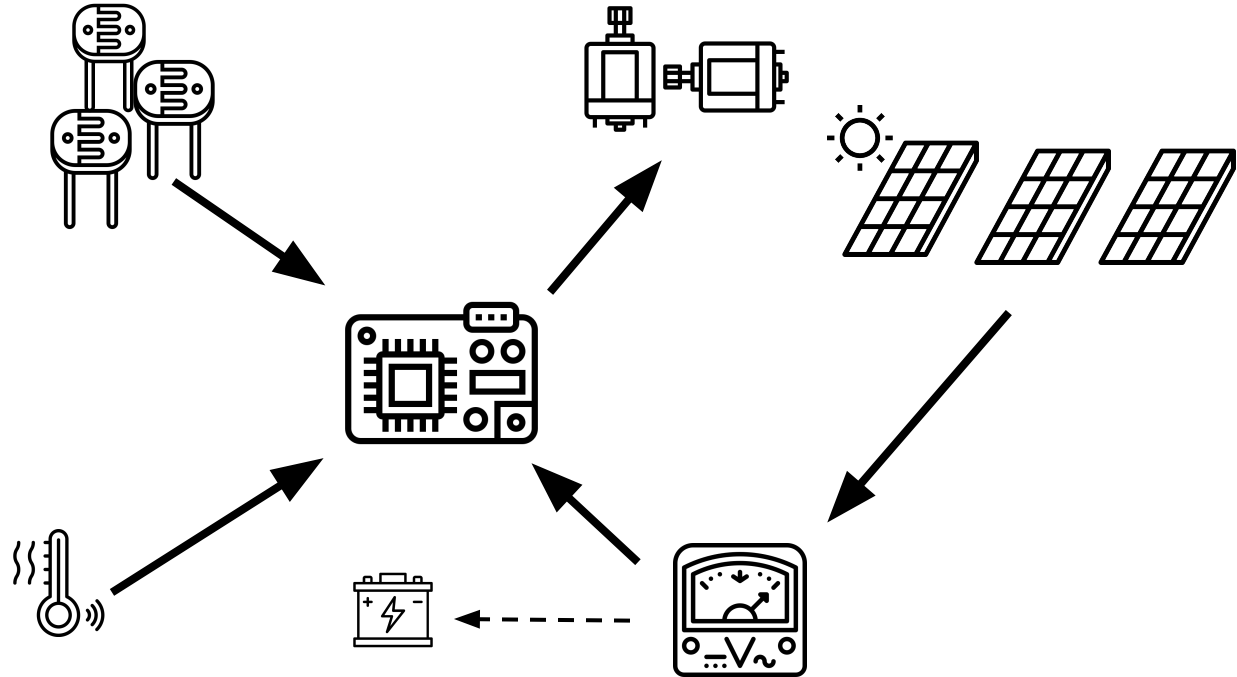
Setup



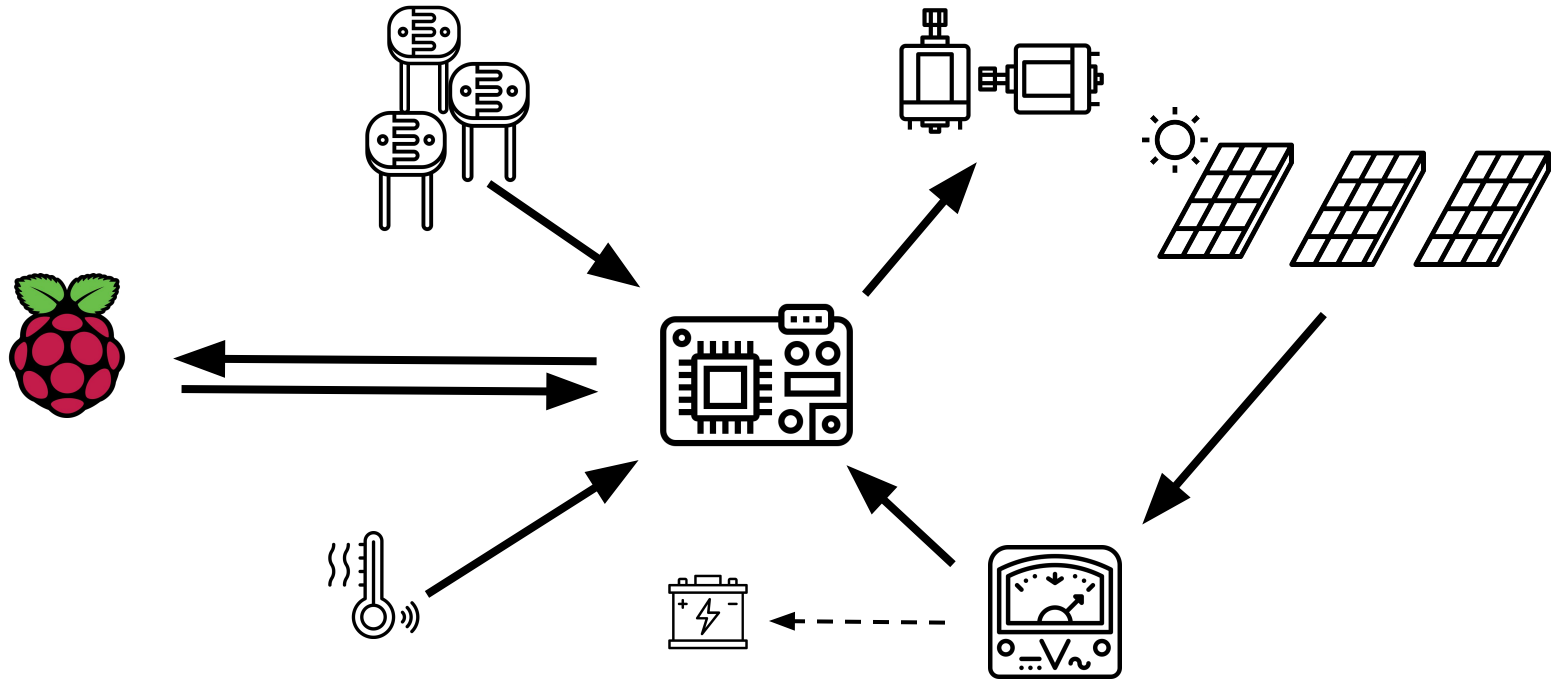
Setup

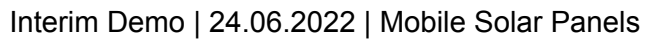


Setup

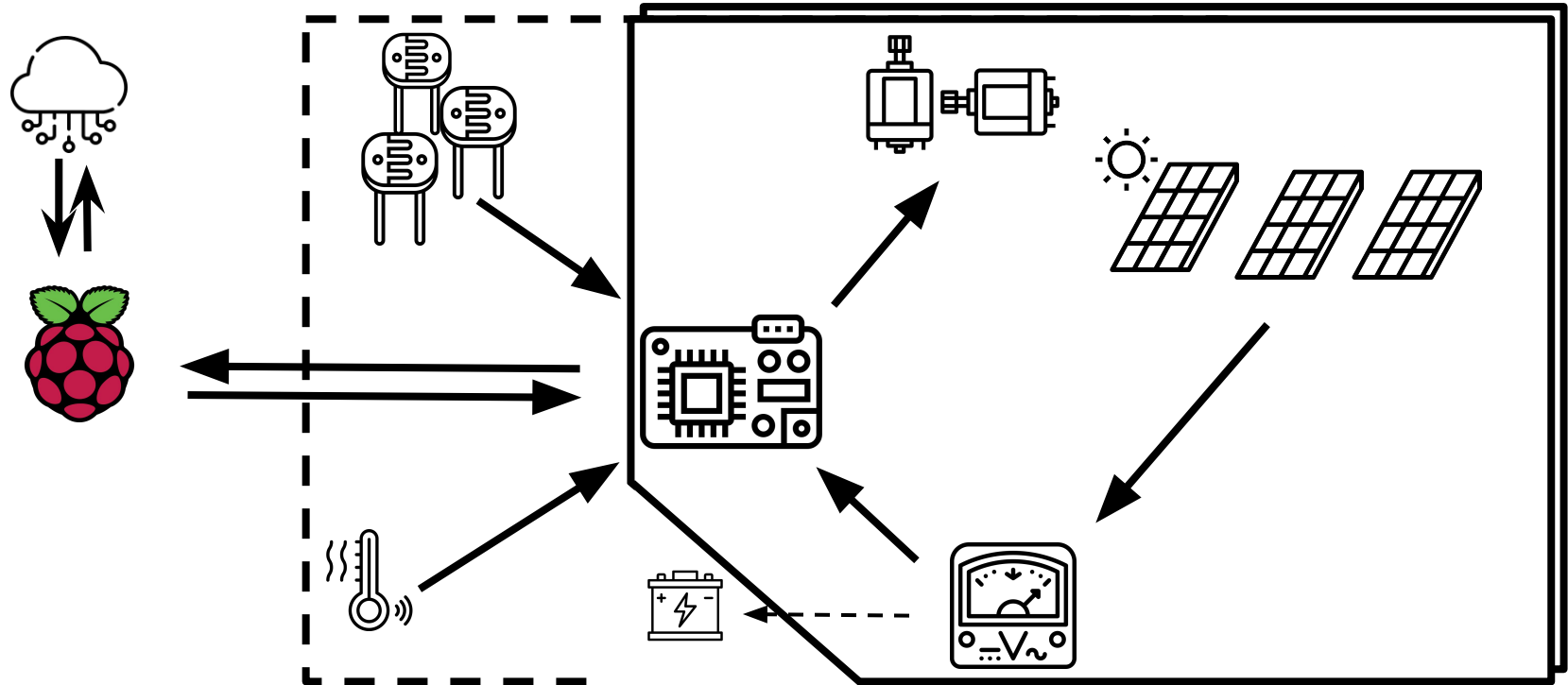


Setup

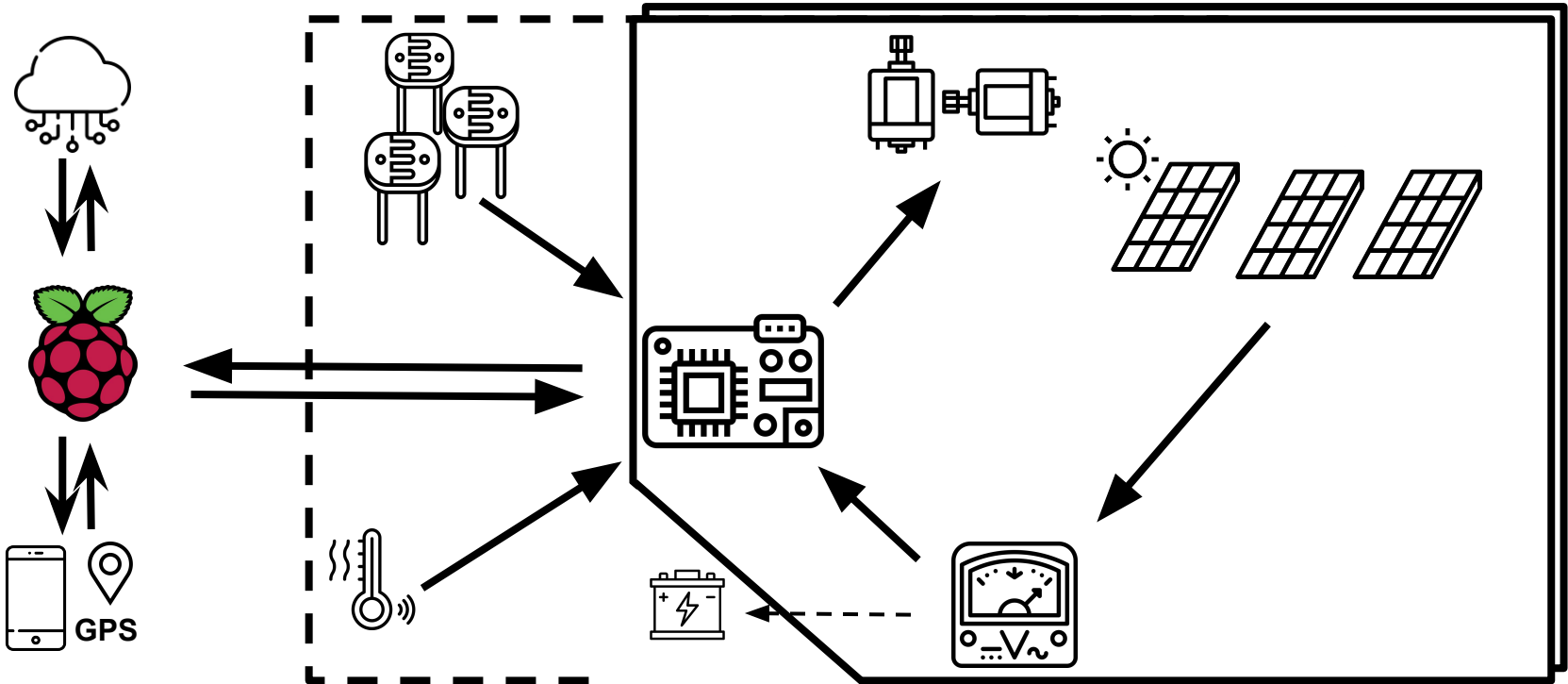




Setup



Setup

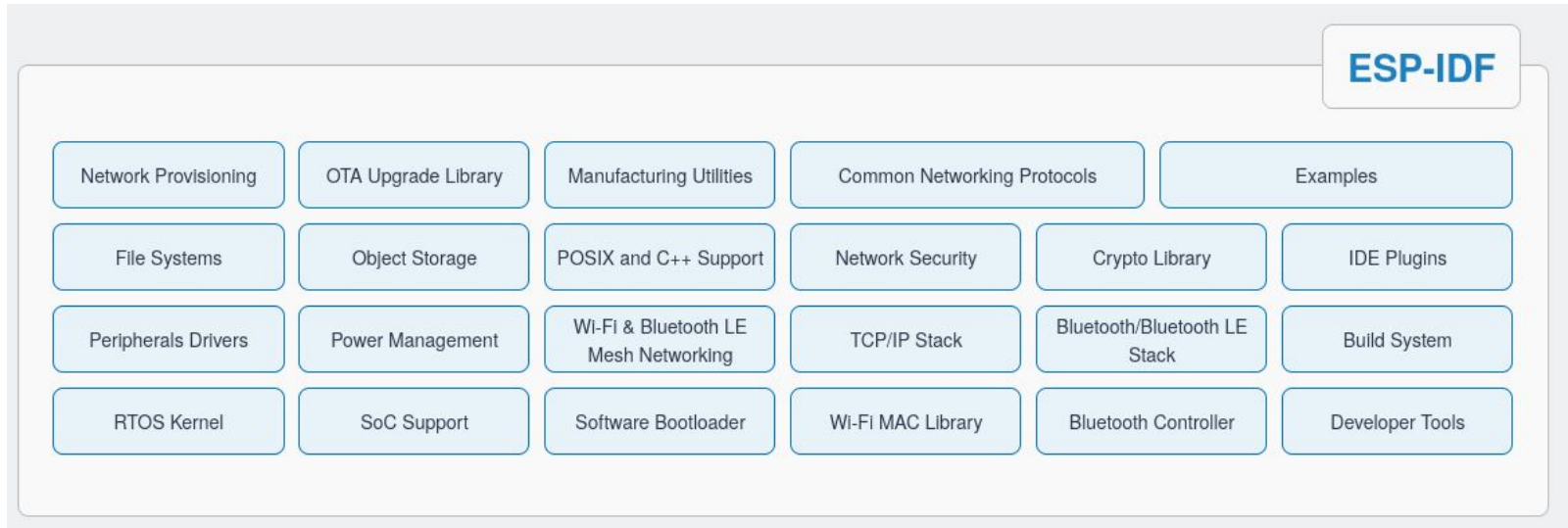


Espressif IDF



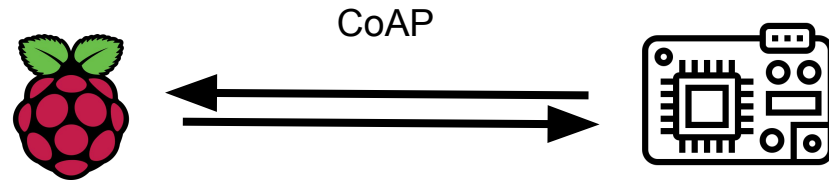
- IoT Development Framework from Espressif
- Full hardware support, RIOT does not support:
 - Multithreading
 - Bluetooth
 - Rust on ESP32
- Rust bindings
- Why Rust?
 - Memory safety guarantees at compile time
 - Same embedded cross-platform development like RIOT
 - It's cool 😎

Espressif IDF

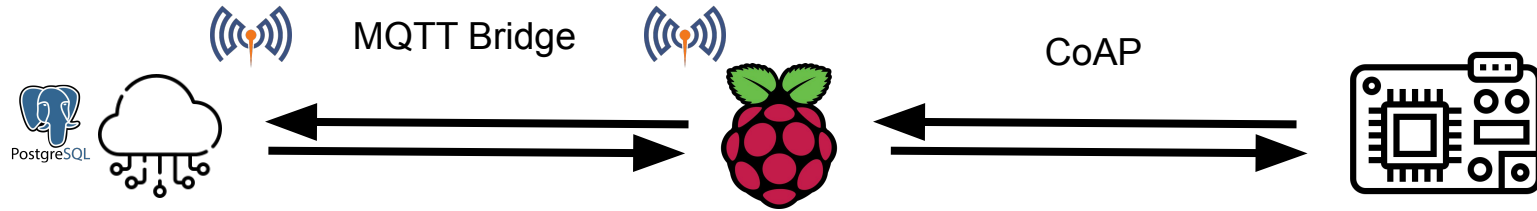


Source: <https://www.espressif.com/en/products/sdks/esp-idf>

CoAP

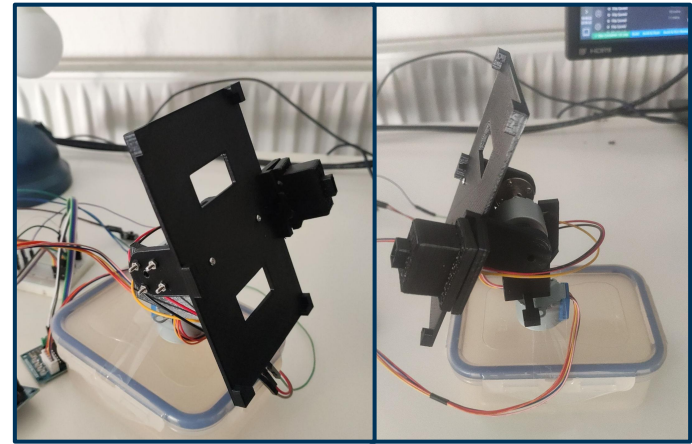
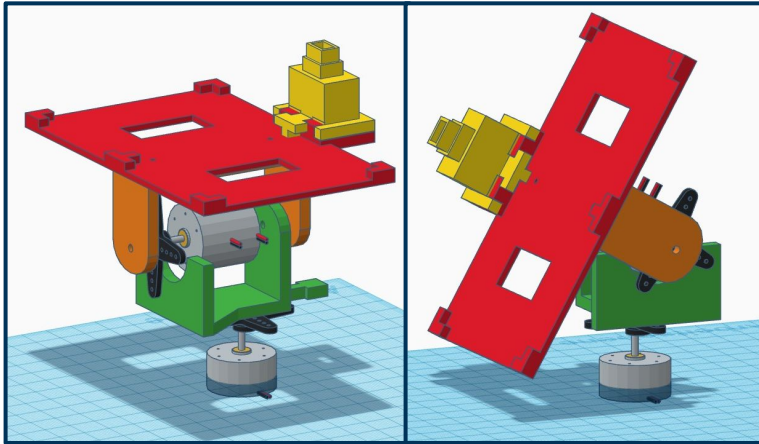


MQTT

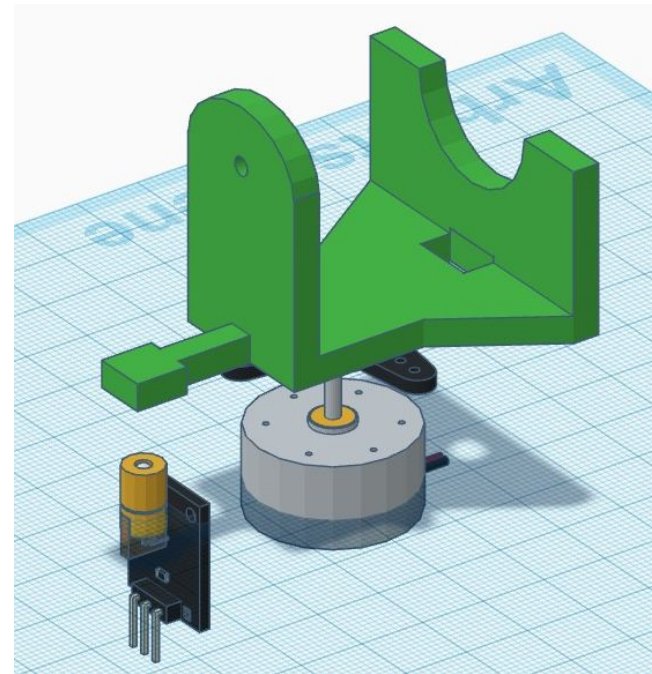
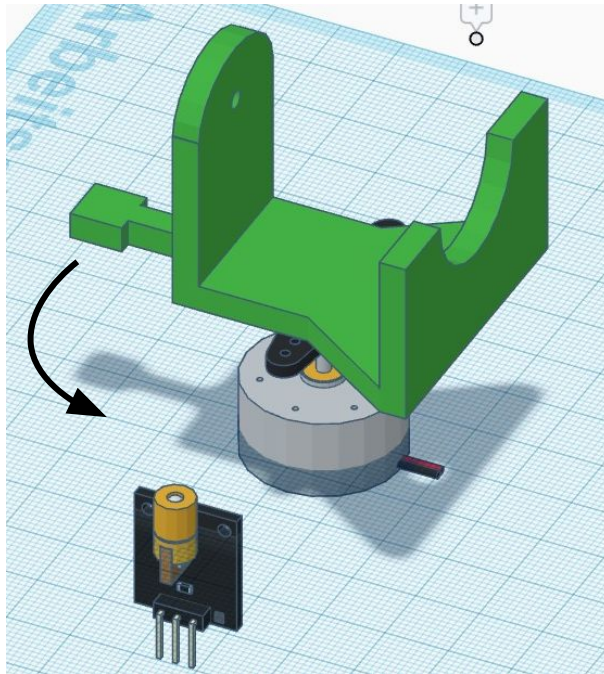


- Mosquitto as MQTT broker
- Containerized cloud and edge applications

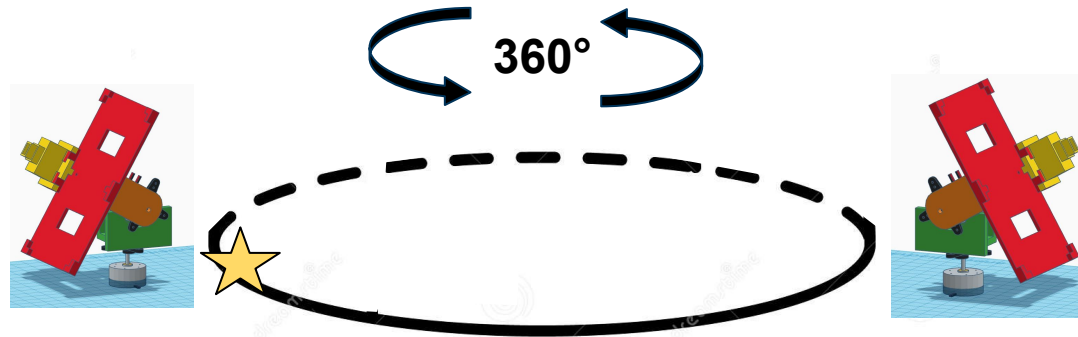
Prototype



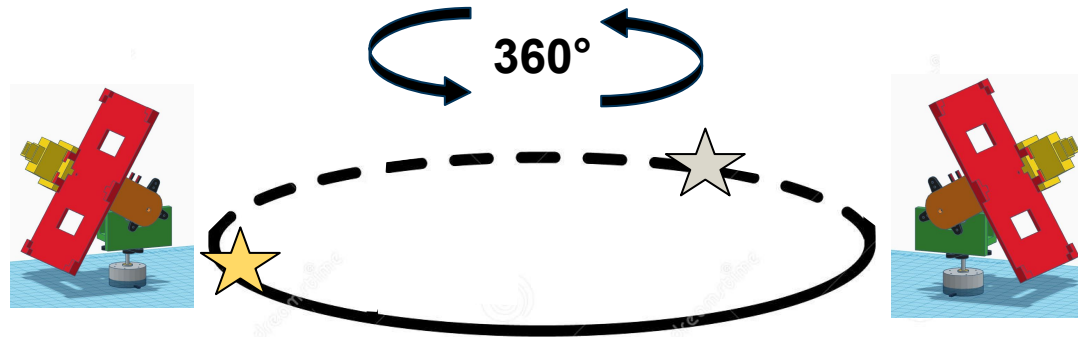
Motor Angle Initialization



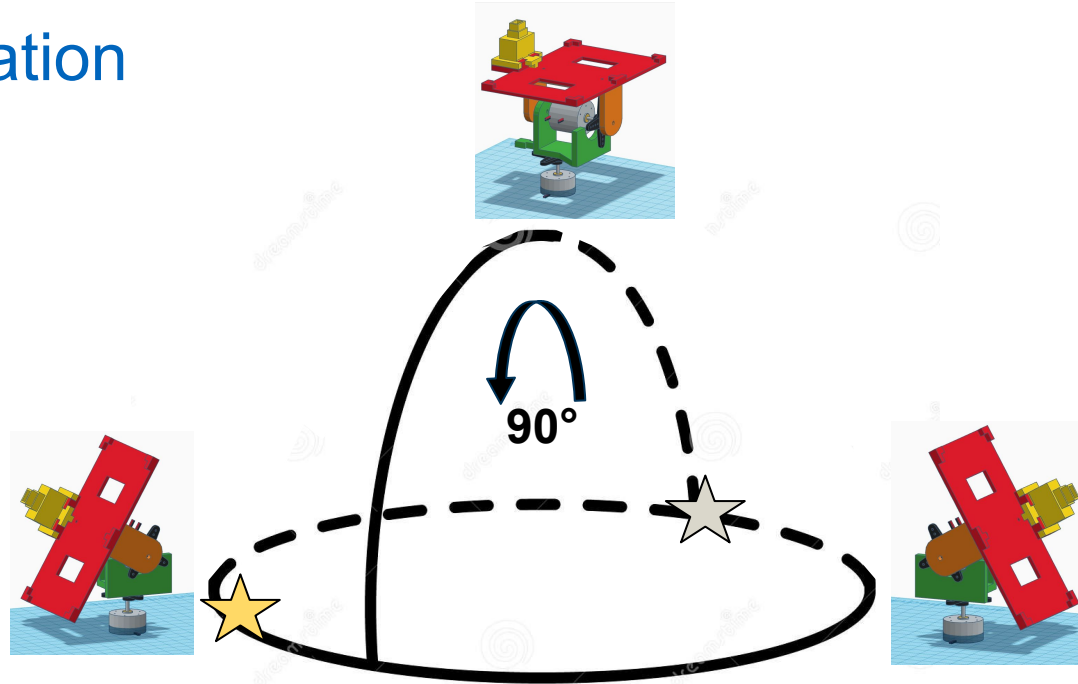
Initial Orientation



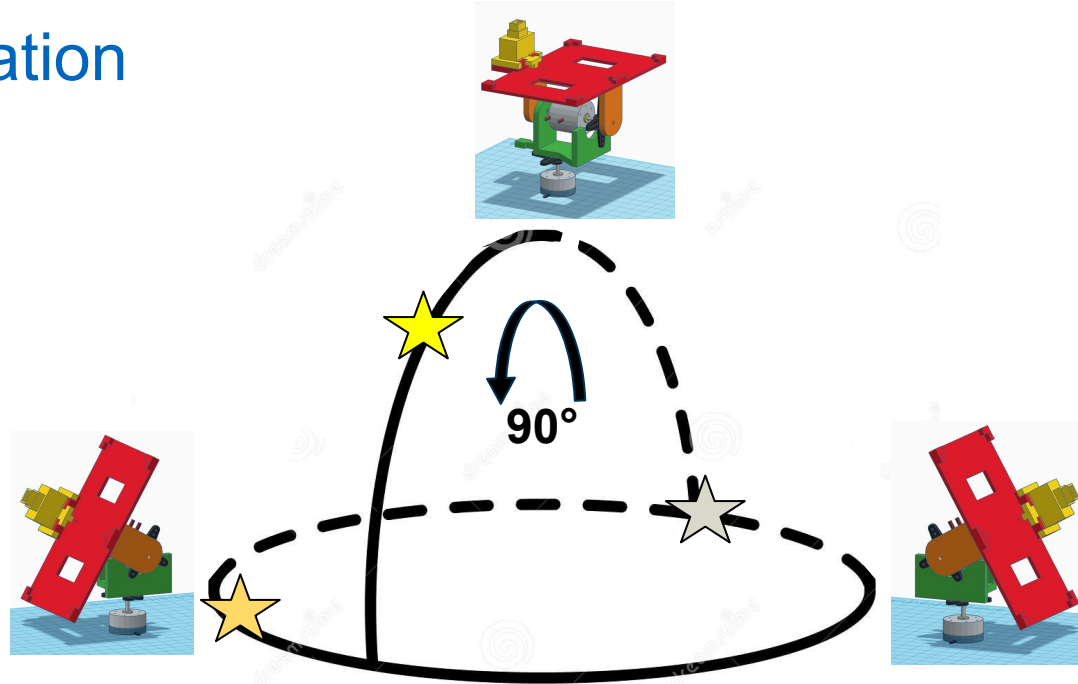
Initial Orientation



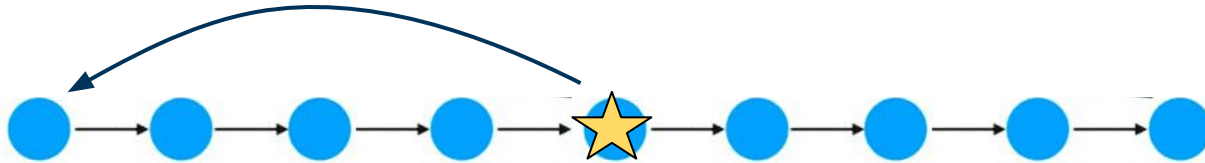
Initial Orientation



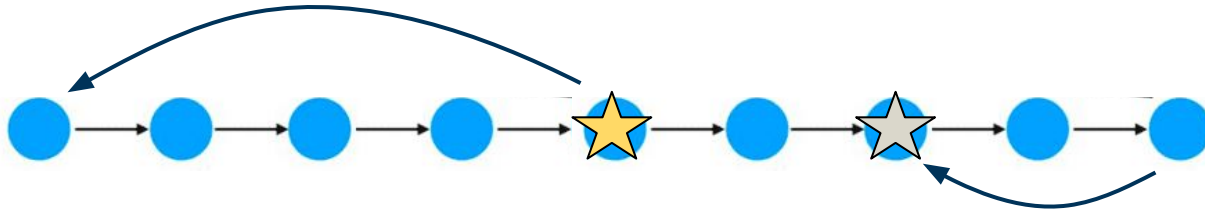
Initial Orientation



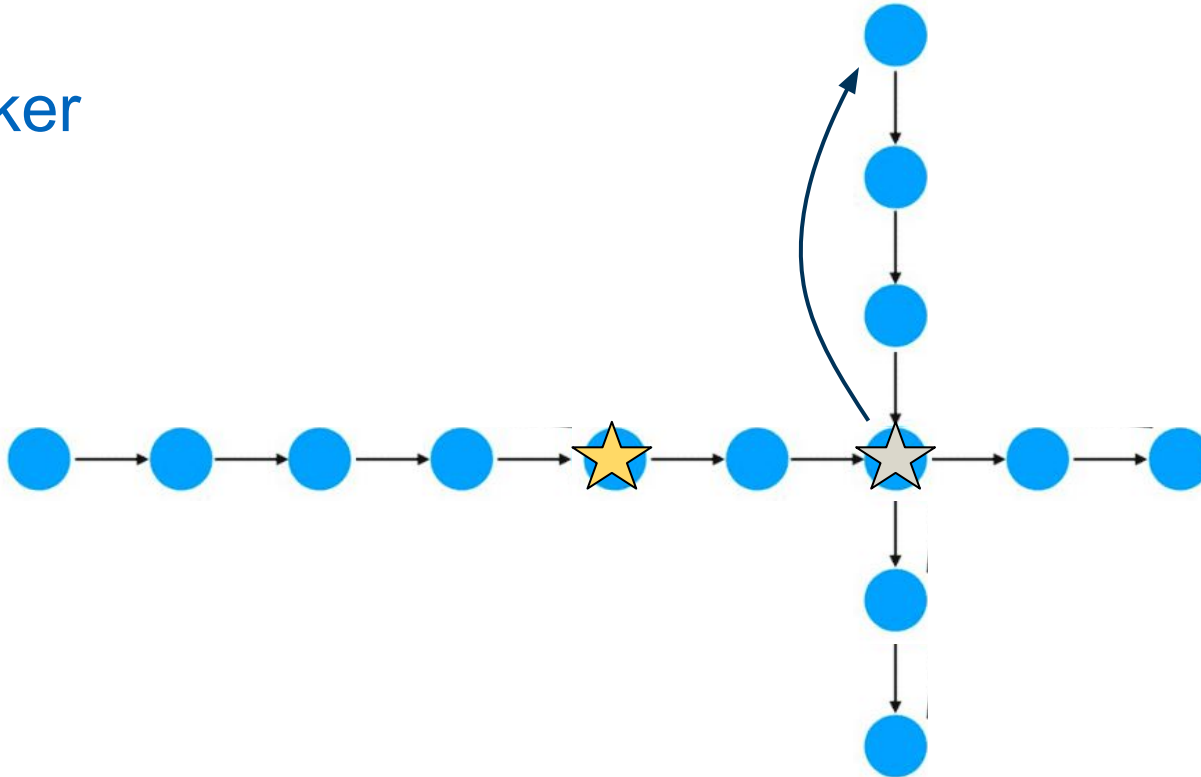
Sun tracker



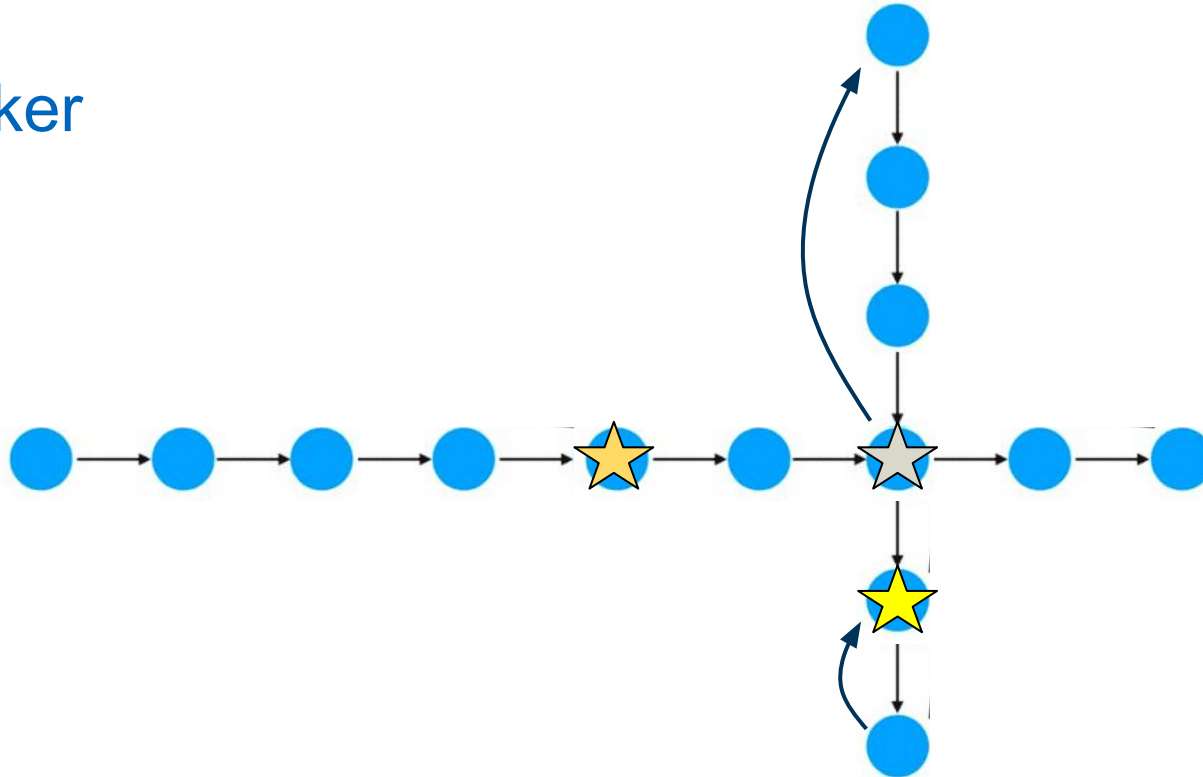
Sun tracker



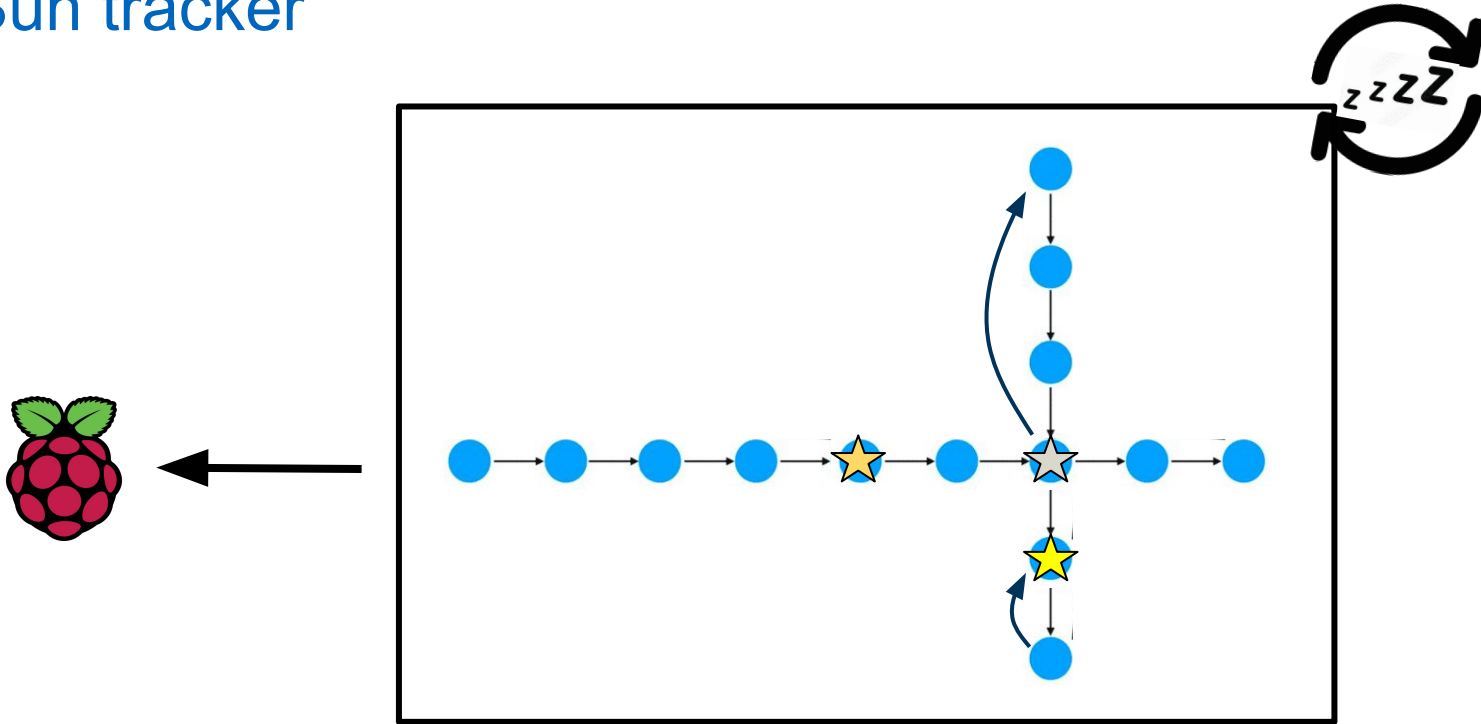
Sun tracker



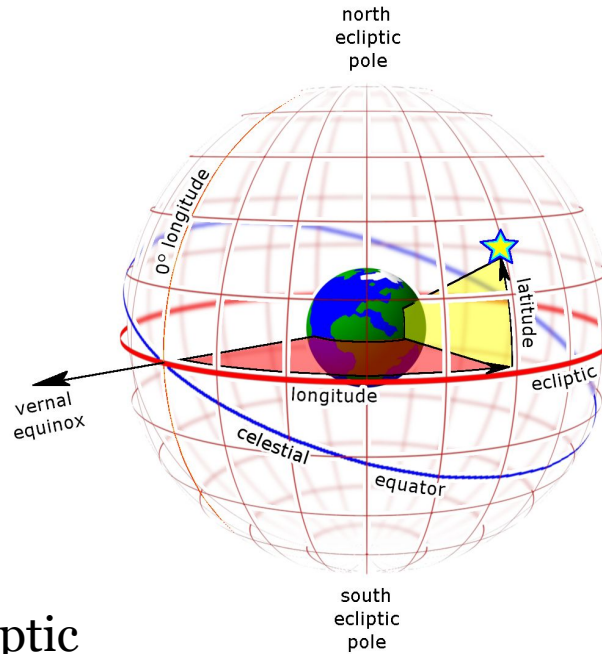
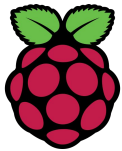
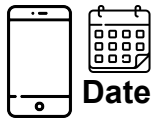
Sun tracker



Sun tracker



GPS Alternative

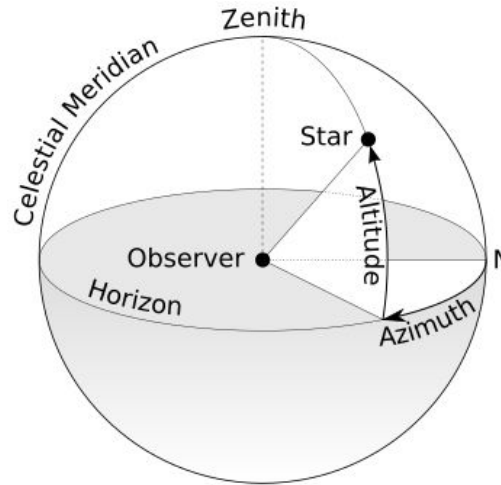
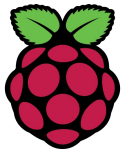


Ecliptic
coordinate system



Equatorial
coordinate system

GPS Alternative

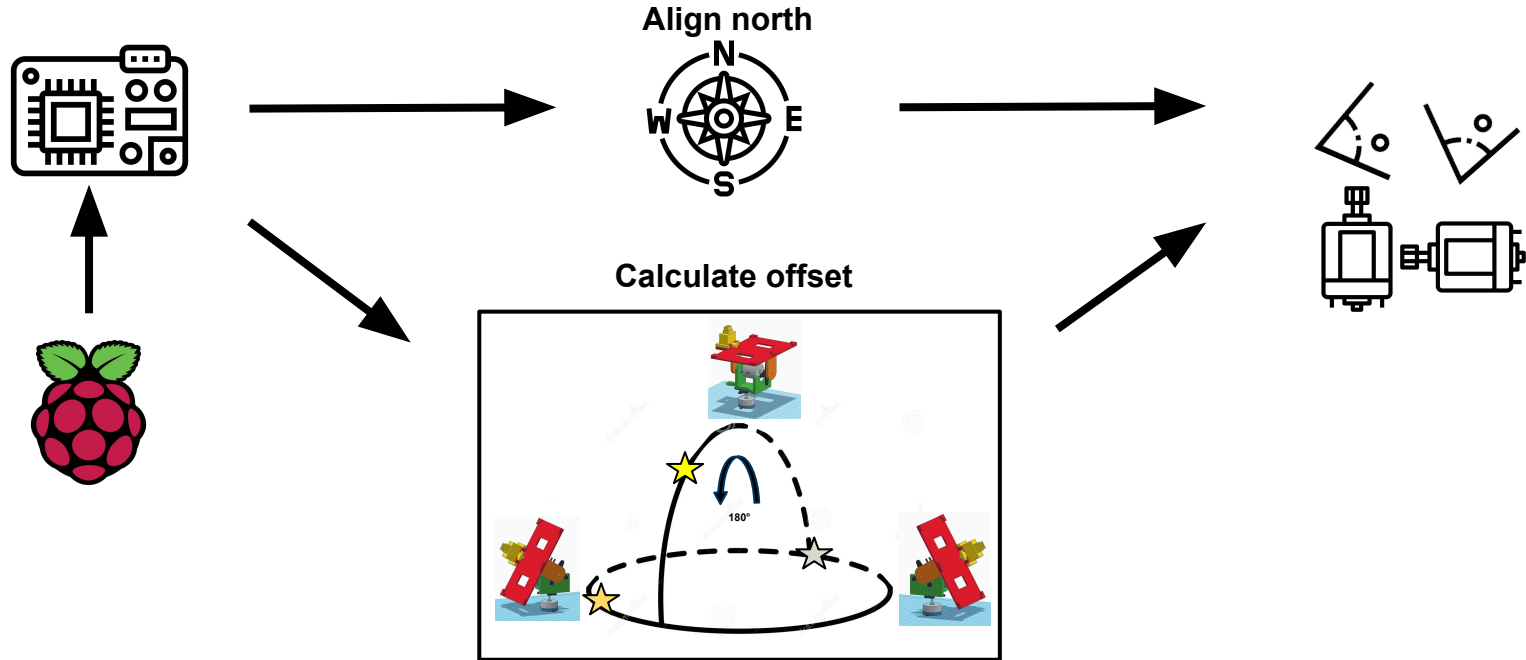


Equatorial
coordinate system



Horizontal
coordinate system

GPS Alternative



Demo