ARMsat

A fully comprehensive implementation of a 32 bit microsatellite

https://github.com/solderneer/ARMsat

Project Goals
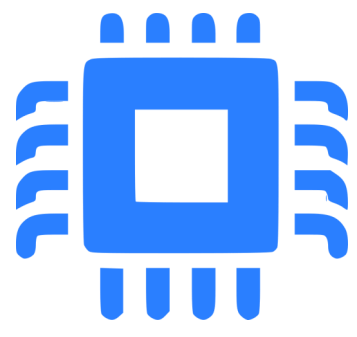
32-bit microsatellite
- Improve performance
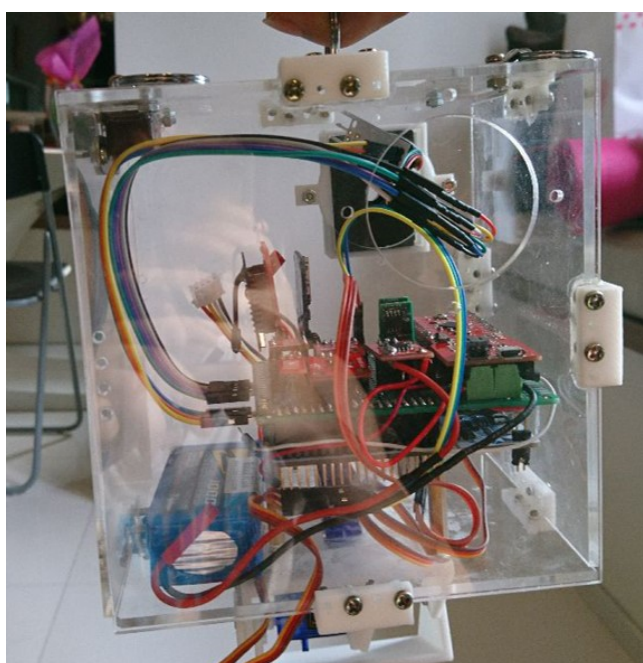- Faster loop time

Durable frame
- Capable of carrying a payload
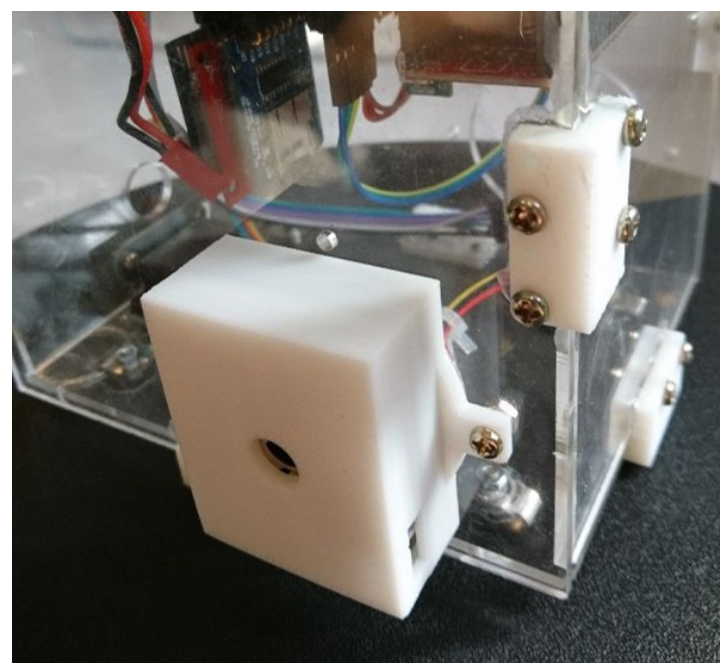- Light and compact

User-friendly ground station
- Self-sufficient control unit
- Complementary desktop app
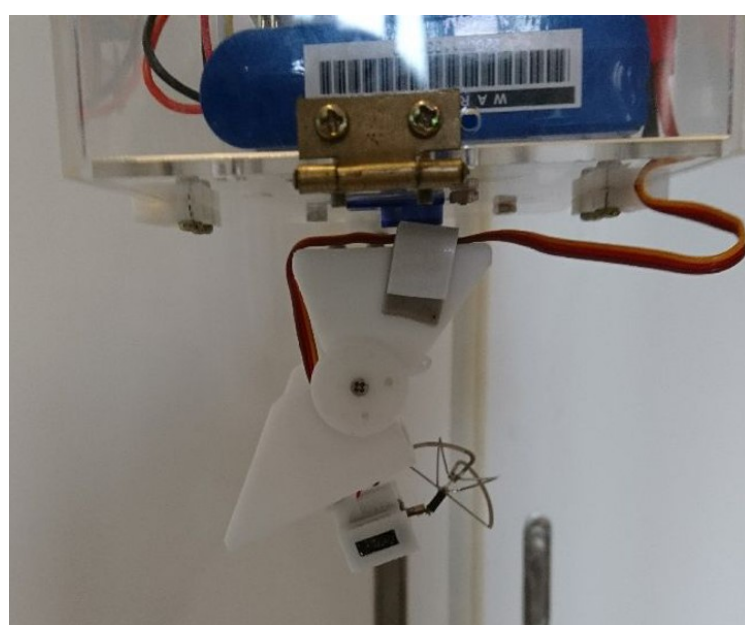
Design of hardware components
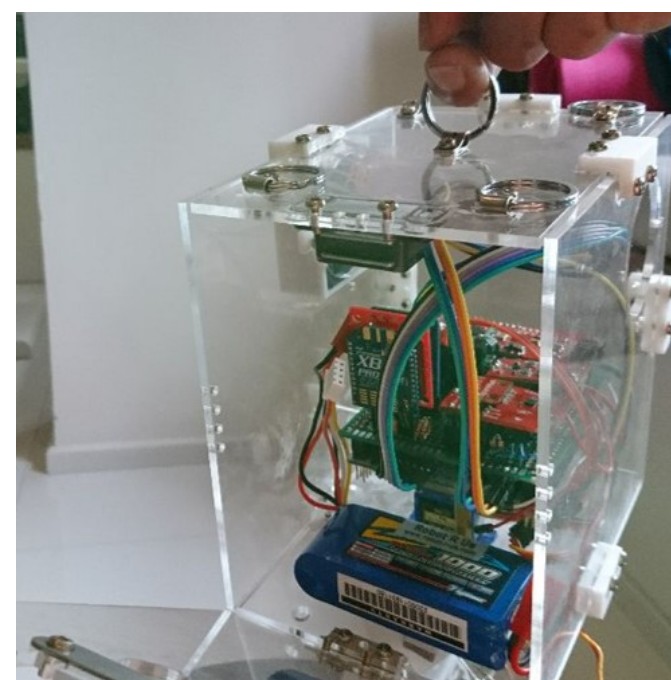

Ventilation
Holes to allow for better ventilation

Dust sensor
3D printed case

Pan-tilt system
2 SG90 servos
5g ultralight camera

Magnetic latch
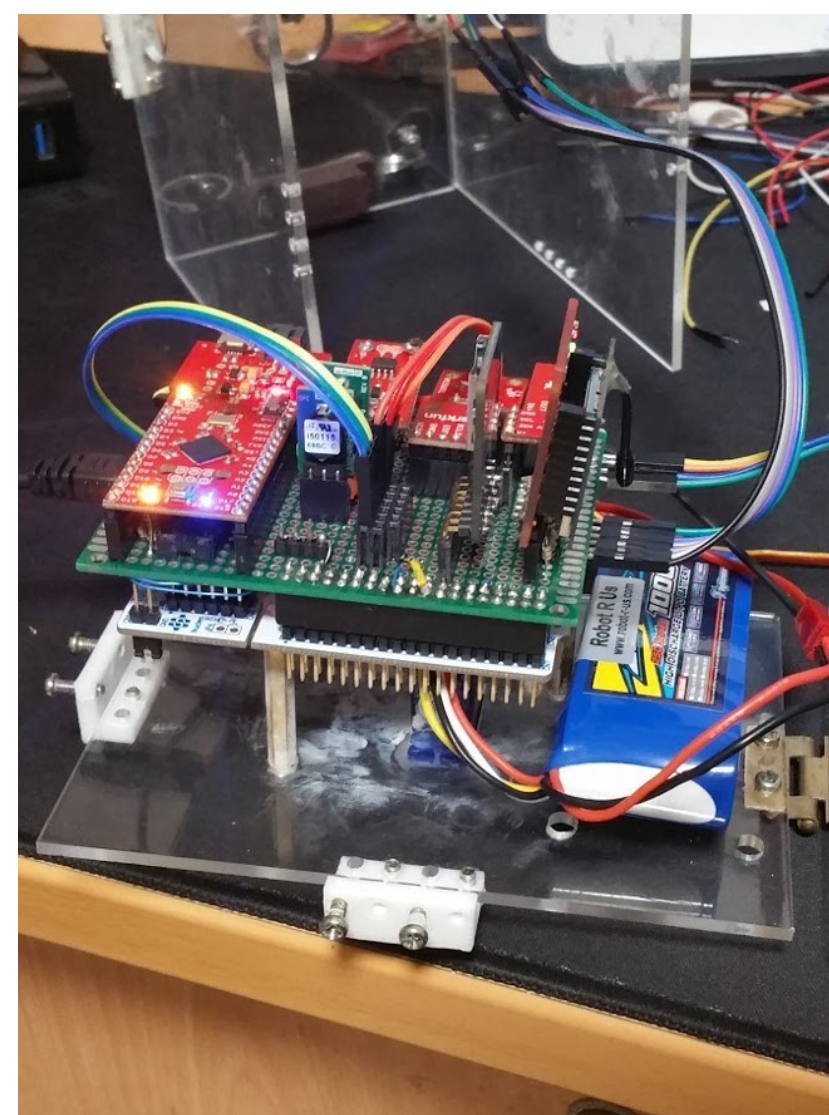Increased electronics accessibility

Electronics

Primary MCU: Nucleo F411RE, Arduino Fio

Onboard sensors: BMP085, TMP102, HIH-4030, GP2Y1010AU0F, MD0550

Additional Peripherals: MicroSD card slot, XBee Pro

Constructed a DIY Nucleo-64 shield
- Easily removable
- One mounting point
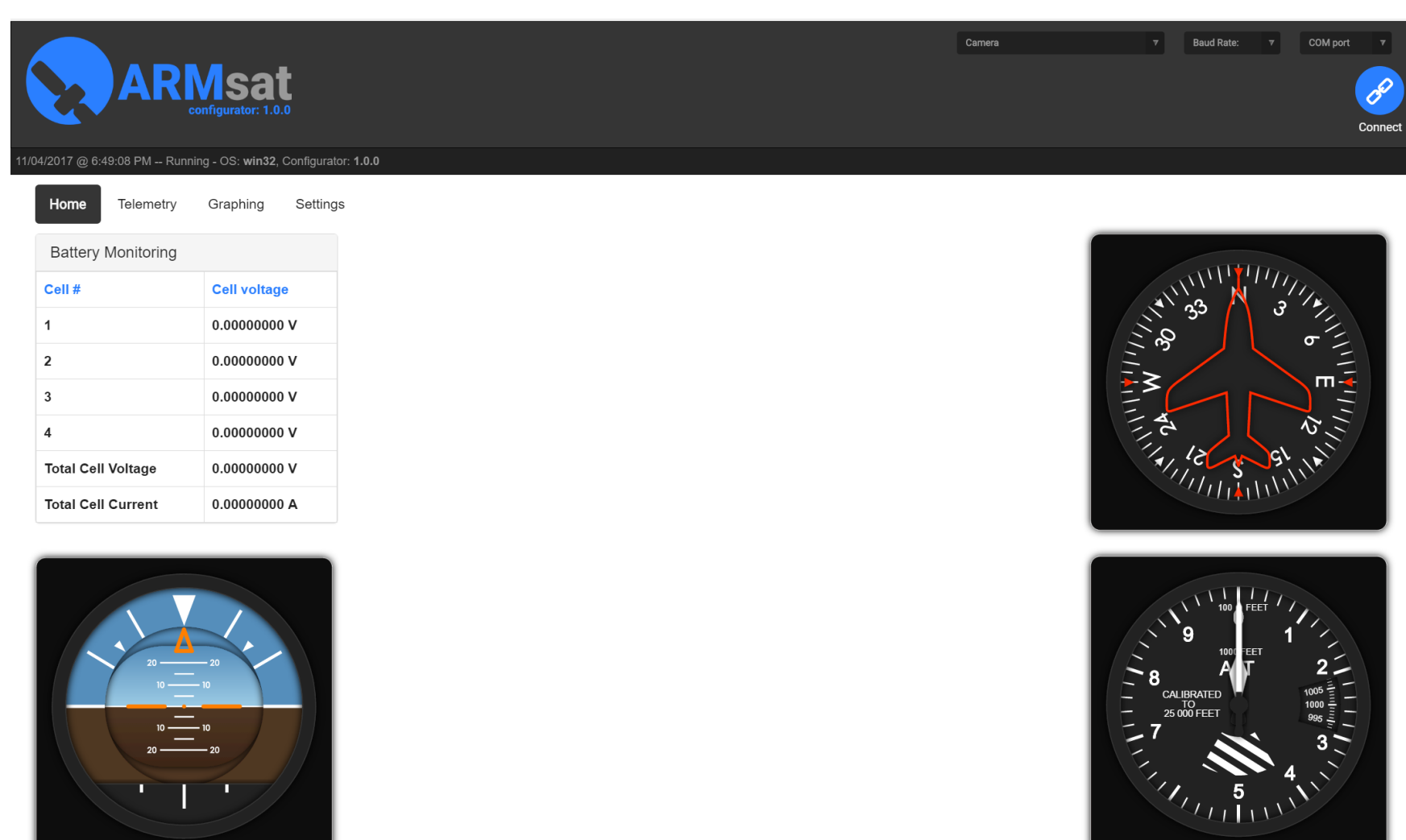- Components of headers
- Modularized

Electronics Design
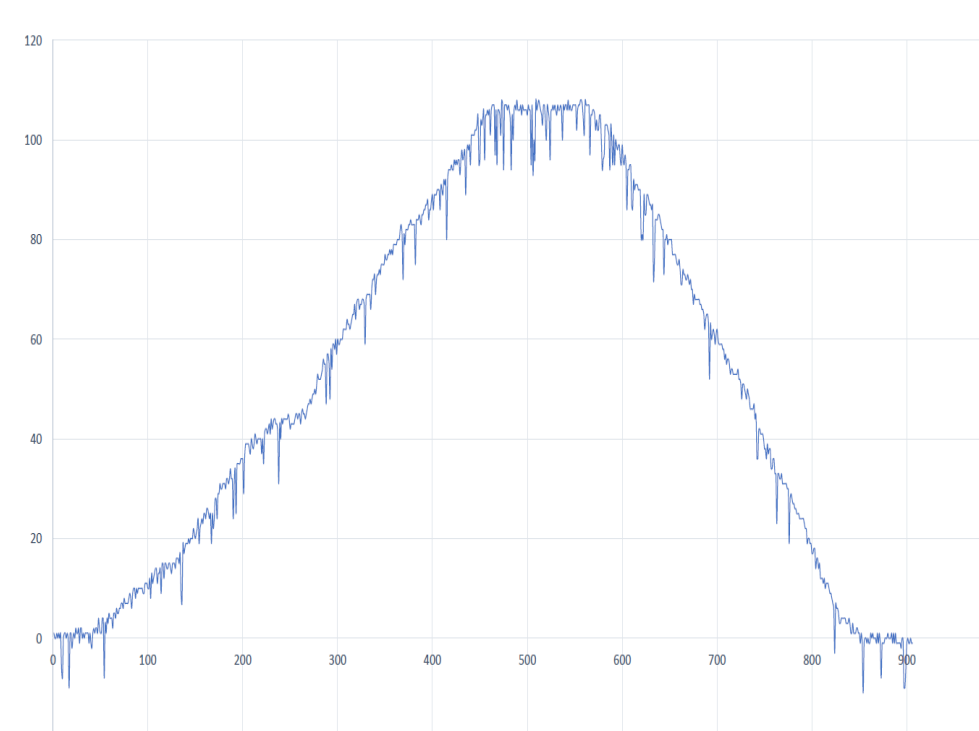

Ground Station interface

Software Design

- Firmware coded in embedded C
  - Custom libraries and drivers
  - More low level control
- App coded in HTML, CSS and Javascript
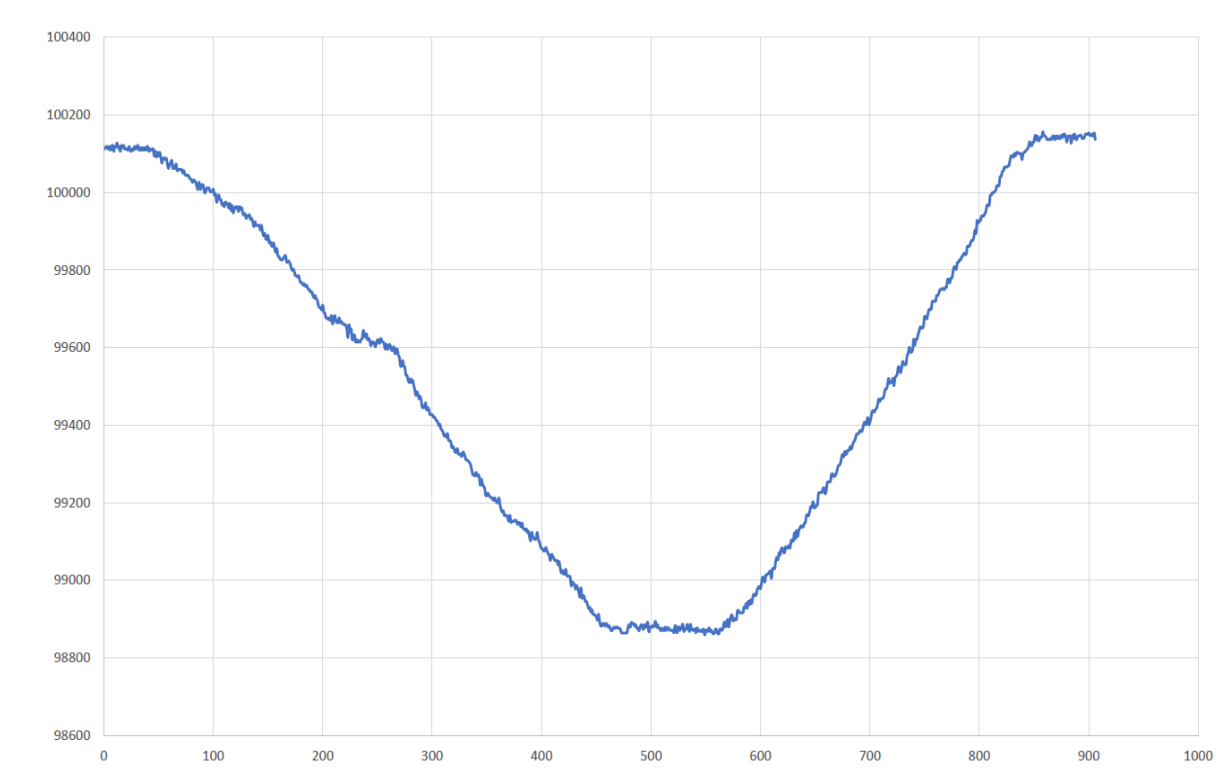 - Electron.js cross platform compatibility
  - NPM modules for functionality
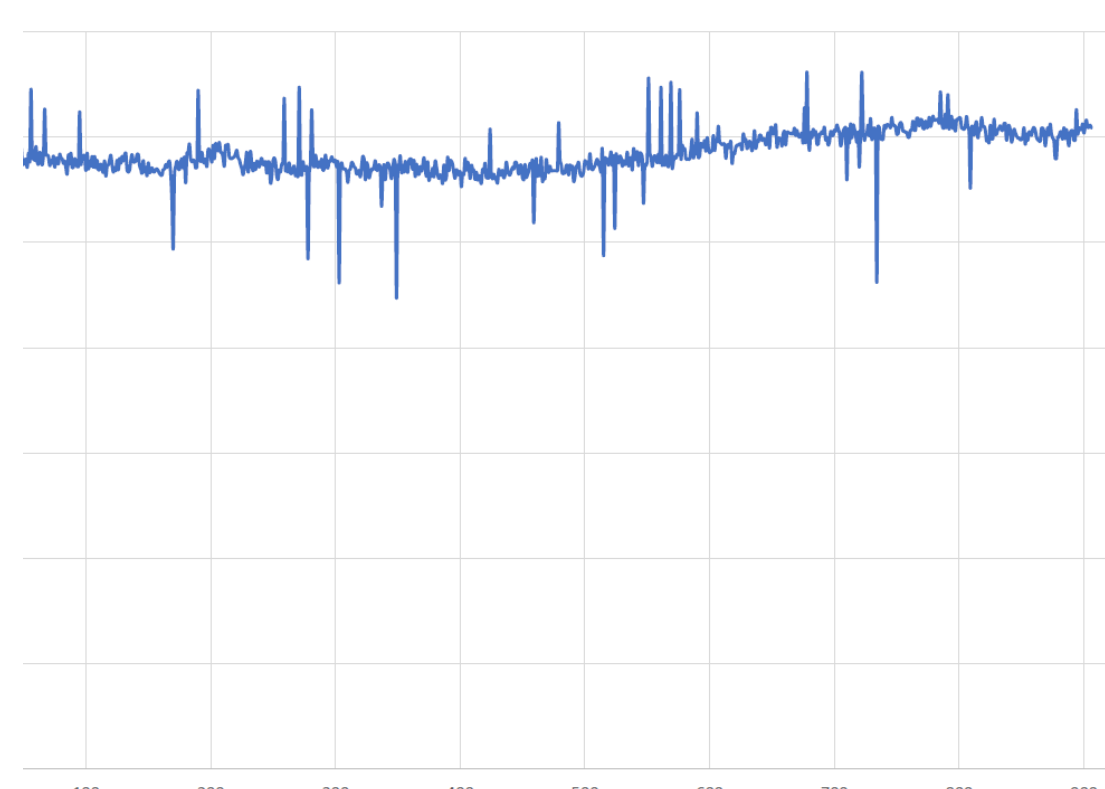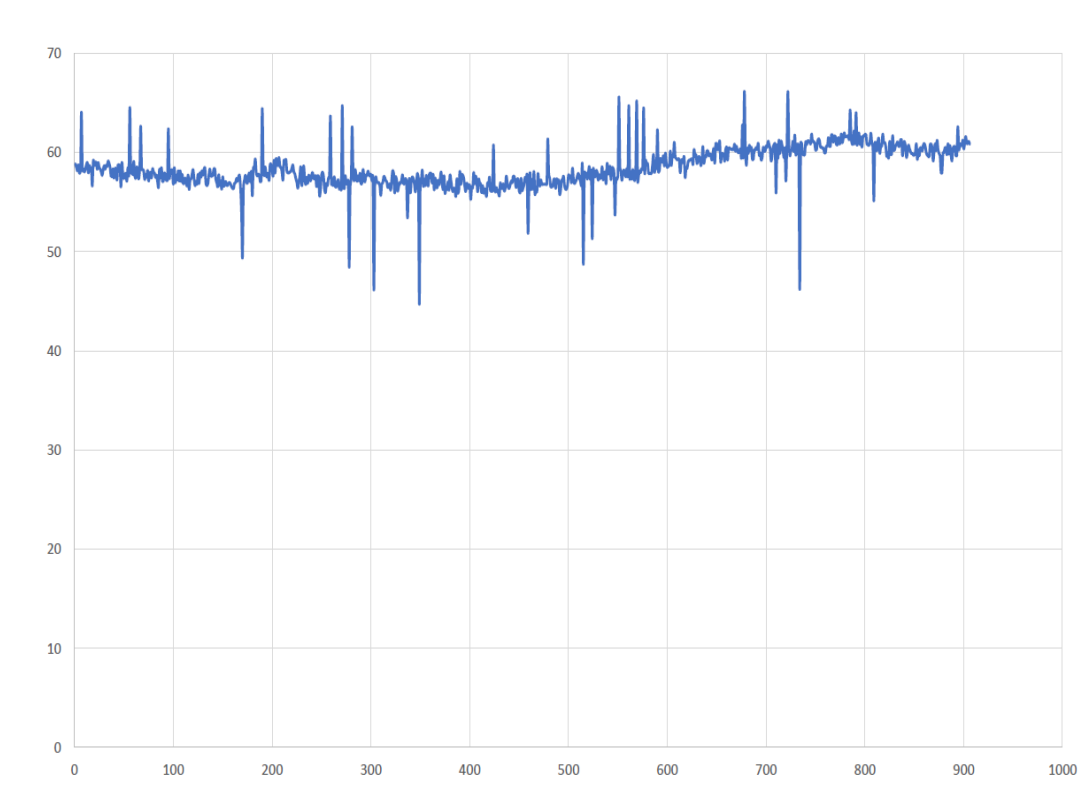

ARMsat configurator app screenshot

Results

Altitude graph

Pressure graph

Temperature graph

Humidity graph

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