

NUCLEO DE AEROESPACIAL

ASTRO

Electronics Report

Author:

Lorem Ipsum (31416)

Lorem Ipsum (31416)

lorem.ipsum@campus.fct.unl.pt

lorem.ipsum@campus.fct.unl.pt

2025/2026 – 1st Semester, DEEC

Contents

1	Electronics Working Volume	3
2	Electronic Components	5
2.1	SRAD	5
2.2	COTS	5
2.3	PSU	5
3	Control Logic / Operating System	6
4	Control System / Dynamics	6
5	Ground Station	7

List of Figures

1	View of future PCB placement	4
2	Current Ground Station	7

Abbreviations

- SRAD – Student Research and Development
- COTS – Commercial Off The Shelf
- RTOS – Real time operating system

1 Electronics Working Volume

- **Dimensions:** 200 mm \times 119 mm (inner diameter)
- **Possible PCB positioning:** triangular configuration

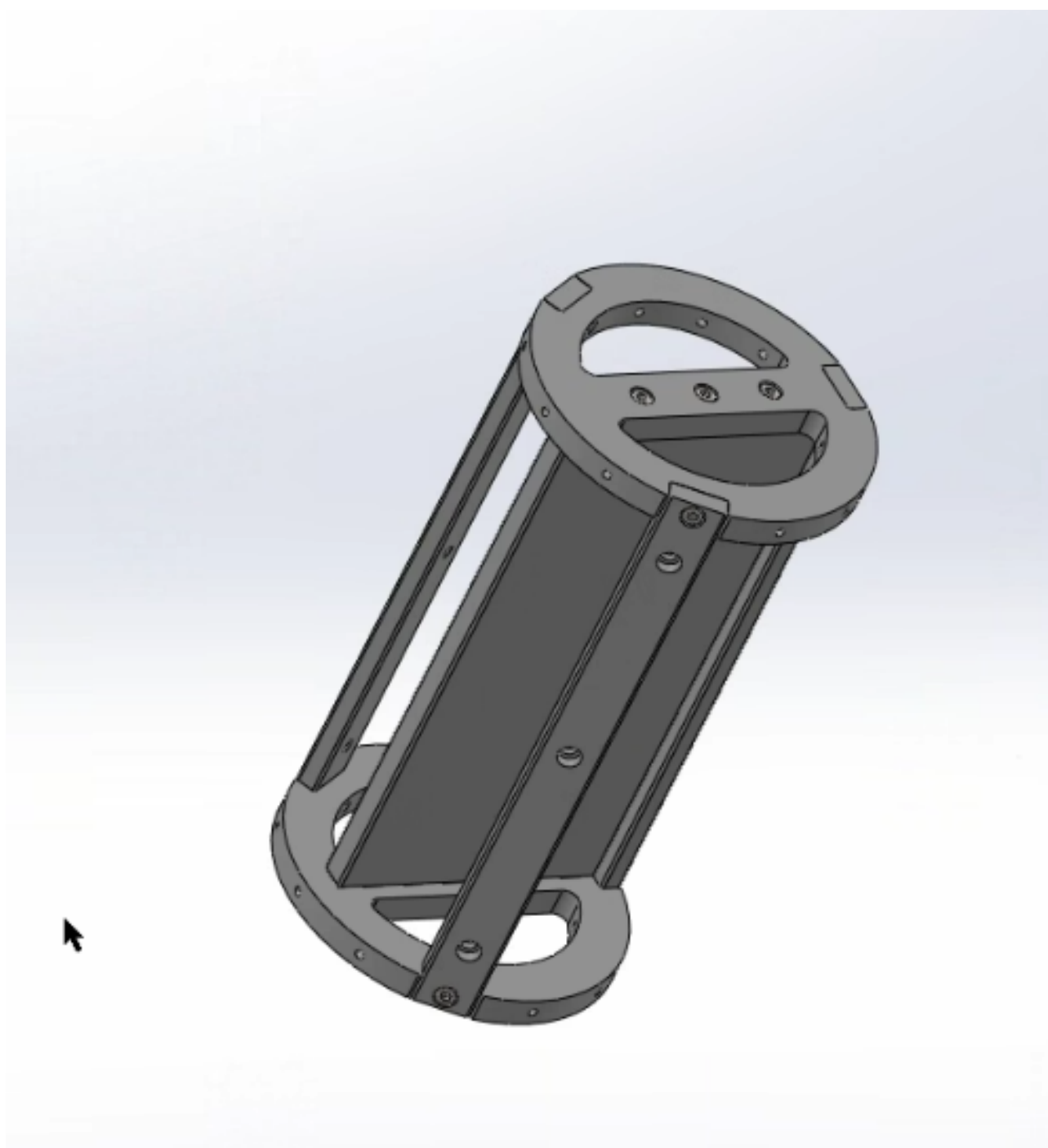


Figure 1: View of future PCB placement

PCB	Designation
PCB 1	SRAD
PCB 2	COTS
PCB 3	PSU

2 Electronic Components

2.1 SRAD

Device	Voltage (V)	Current (mA)	Power (mW)
CPU STM32F411	1.8 – 3.6	?	?
6DOF IMU ICM-45686	3.3	34	?
3DOF accelerometer ADXL375	2.0–3.6	145 μ A	?
3DOF magnetometer LIS2MDL	1.71 – 3.6	200 μ A	?
Barometer MS5607	1.8–3.6 V	1.4	?
GPS module NEO-M9N	3.6	?	?
LoRa SX1278 Ra-02	1.8 – 3.3	105	?
SparkFun microSD Transflash	3.3	20	?

2.2 COTS

Device	Voltage (V)	Current (mA)	Power (mW)
CATS Vega	7–24	100	321.75

2.3 PSU

- Converts main battery voltage to 5 V, and 3.3 V
- Can be disconnected via an arming pin (to be removed before flight)

Battery System

Electrical power is supplied by two Lithium-Polymer (LiPo) batteries:

- **Main Battery (SRAD):** 7.4 V, 2400 mA·h
- **Redundancy Battery (COTS Flight Computer):** 7.4 V, 2400 mA·h

Gens ace 2400mAh 2S 7.4V RX Lipo Battery Pack with JST-SYP Plug

Parameter	Value
Balancer Connector Type	JST-XHR-2P
Brand	Gens Ace
Capacity (mAh)	2400
Configuration	2S1P
Connector Type	JST-SYP
Discharge Rate (C)	/
Height ($\pm 2\text{mm}$)	17
Is Featured Product	No
Length ($\pm 5\text{mm}$)	88
Max Burst Discharge Rate (C)	NO
Net Weight ($\pm 20\text{g}$)	94
Over 300Wh	No
Preorder Config	No
Store No.	M502A
Voltage (V)	7.4
Width ($\pm 2\text{mm}$)	29
Wire Gauge	AWG20#
Discharge Wire Length (mm)	80
Quantity per Box	42 pcs/box
Capacity Range (mAh)	1000–2999

Table 1: Specifications of Gens Ace 7.4V 2400mAh LiPo Battery

Additionally, external power can be provided via a pad connector to keep the main battery fully charged during pre-flight checks.

3 Control Logic / Operating System

- The COTS system will always send the recovery deployment signal.
- It will overrule any other signal sent by the SRAD computer.
- RTOS: FreeRTOS

4 Control System / Dynamics

(Section Placeholder)

5 Ground Station

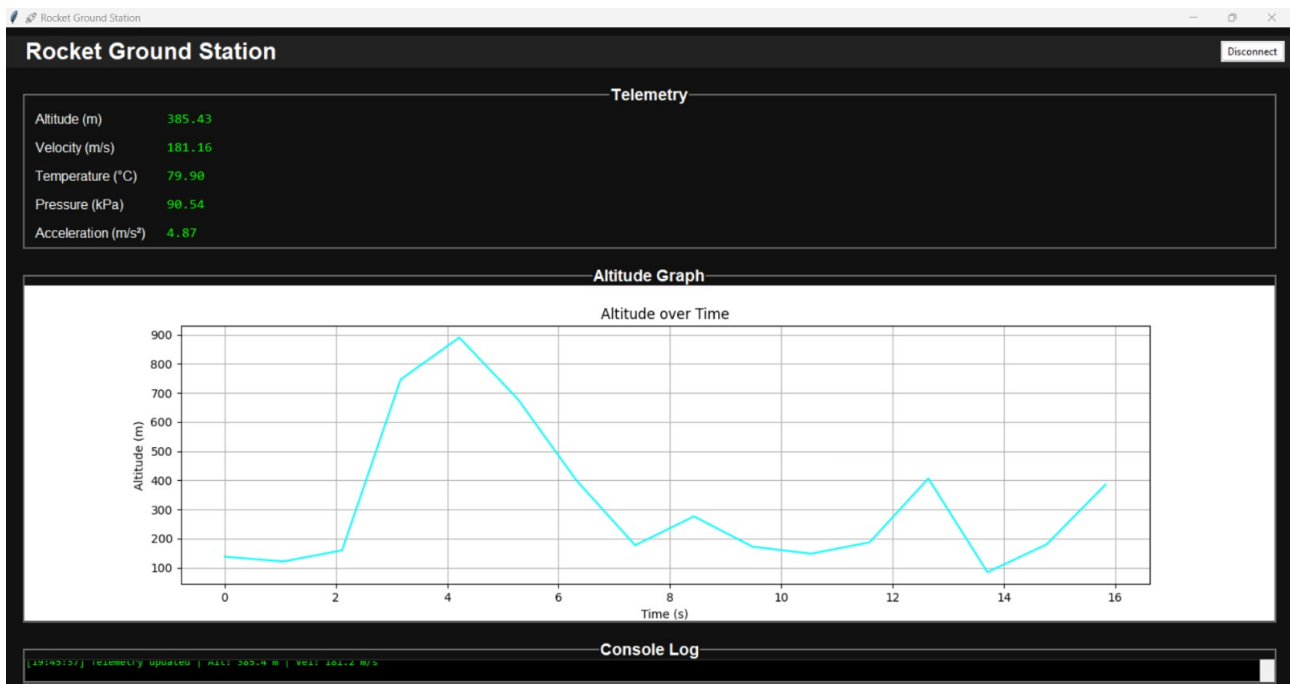


Figure 2: Current Ground Station

TODO:

- Add simulation CSV data input
- Display position in 3D
- Temperature data
- Airbrake percentage
- Gyroscope pressure data
- Parachute trigger (main/rogue)
- Ask for team feedback
- Rocket arming signal
- Time tracking
- Internal pressure measurement