



# Sparrow 2025

CODE SPECIFICATION

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# Summary

01

**Phases of flight**

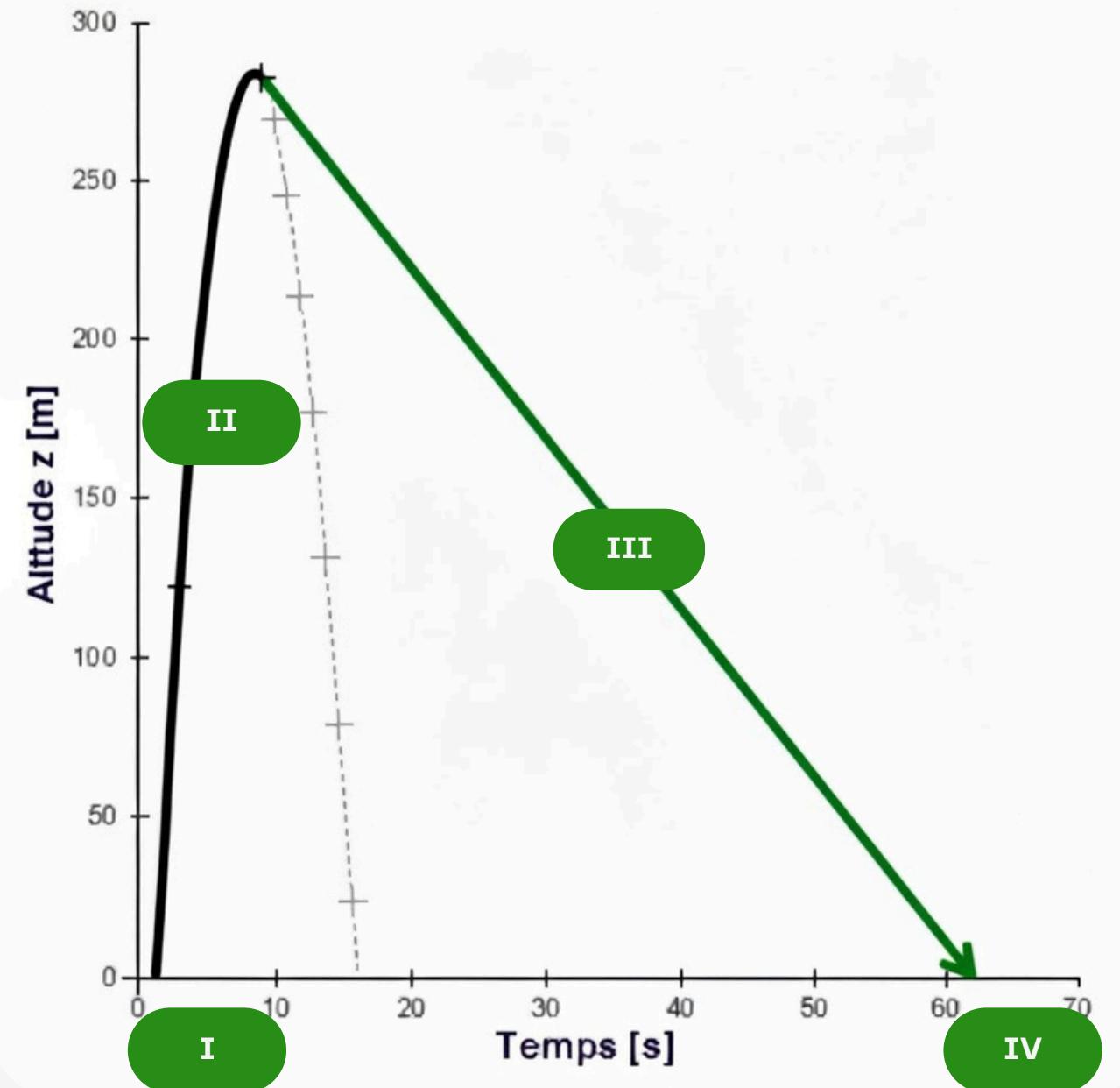
02

**CNES's  
Specifications**

03

**Our  
Specifications**

# Phases of flight



0

**Preparations before launch pad**  
until being on the launch pad

I

**Phase on the launch pad**  
until Launch

II

**Ascending phase**  
Parachute released

III

**Descending Phase**  
Until Landing

IV

**Ground phase**



0

## Preparations before launch pad until being on the launch pad

- Begin init : 1 bip at 800Hz
- Initialization ....
- End init : 3 bips separated by 0.2 seconds at 800Hz

I

## Phase on the launch pad until Launch

- 1 bip every 0.2 seconds at 1000Hz
- If acceleration > 15 m.s<sup>2</sup>  
→ Launch detected



II

## Ascending phase

Parachute released

● **1 bip per second at 1500Hz**

● **If 5 values of altitude in a row are decreasing and  $t > t_{apogee} - 2sec$**

● **If  $t > t_{apogee} + 2sec$**

→ **Parachute opening**



III

### Descending Phase

Until Landing

- **1 bip every 0.5 seconds at 2000Hz**
- **if the altitude is stable with an error of 1 meter for 10 values in a row**
  - **Landing detected**

IV

### Ground phase

- **Close the data file**
- **Stop Buzzer**
- **Stop the program**

# CNES's Specifications

**The parachute is deployed when reaching the maximum of altitude (move the servo motor).**

- For safety reasons, we check with a timer that its deployment is within a certain range of time so that it does not deploy either too soon or too late in the case of a false measure.
- The sensors have some noise on the measures. Therefore, we consider that we have reached the maximum of altitude when 5 values of altitude in a row are decreasing.

**Before the launch, you need to have a buzzer on the rocket that indicates that the card is ready for takeoff.**

# Our Specifications

**Make sure that you have enough storage capacity (2MB) in regards to the frequency of the main loop (for a margin, you can take a duration of flight of 3 minutes)**

**We consider that the rocket is launched when we measure an acceleration superior to  $15 \text{ m/s}^2$**

**We consider that the rocket has landed when the altitude is stable with an error of 1 meter for 10 values in a row. At this point, we can stop close the data file and stop the while loop.**



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