



GUARANISAT-2

Project Overview



Overview of GUARANISAT-2 satellite

Project objectives



Promote project-based learning strategies to **increase Paraguay's space capacity**



Design, build, test, launch, and operate **Paraguay's second satellite**



Pave the way for a **sustainable Paraguayan space program**



Overview of GUARANISAT-2 satellite

Mission objectives

1

To provide UHF/VHF band communication services to the amateur radio community using a 3U CubeSat.

Amateur Missions

➔ APRS Payload Store&Forward and Digipeater (APRS) - **AEP/FPUNA/FIUNA**

➔ LoRa Store&Forward (LORA) – **FPUNA**



Overview of GUARANISAT-2 satellite

Mission objectives

2

To foster student engagement in STEM projects through educational missions of interest to the amateur radio community.

Educational Missions

- ➔ South Anomaly Monitoring Unit (MUA) - **FIUNA**
- ➔ Sparrow SCP Carrier Card (SCC) - **JPL**



Overview of GUARANISAT-2 satellite

Mission objectives

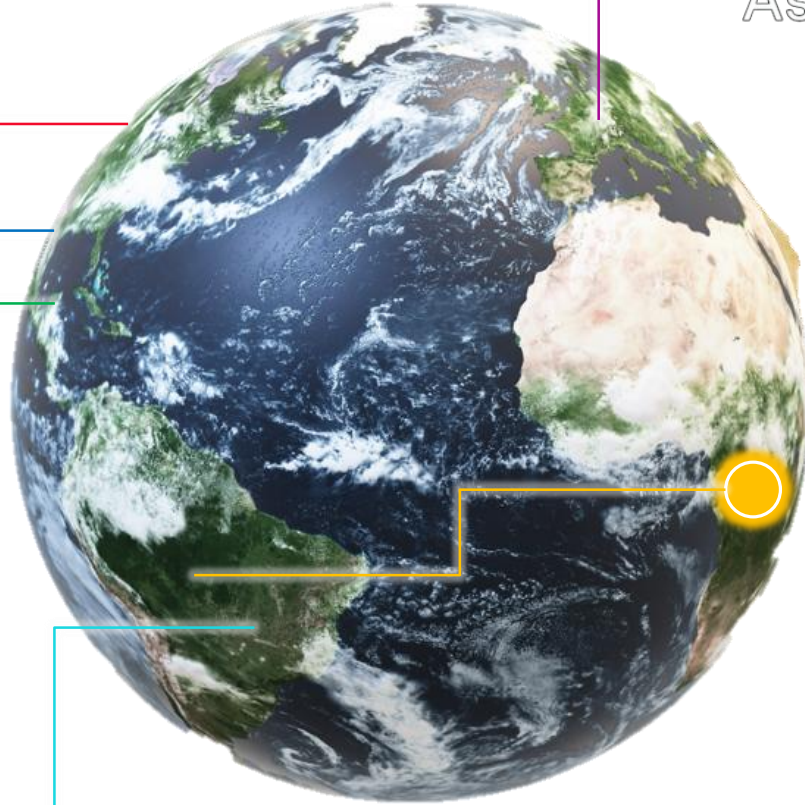
3

Adapt BIRDS standard bus while improving its capabilities.

Our supply-chain system is immature for space's technologies stuffs!



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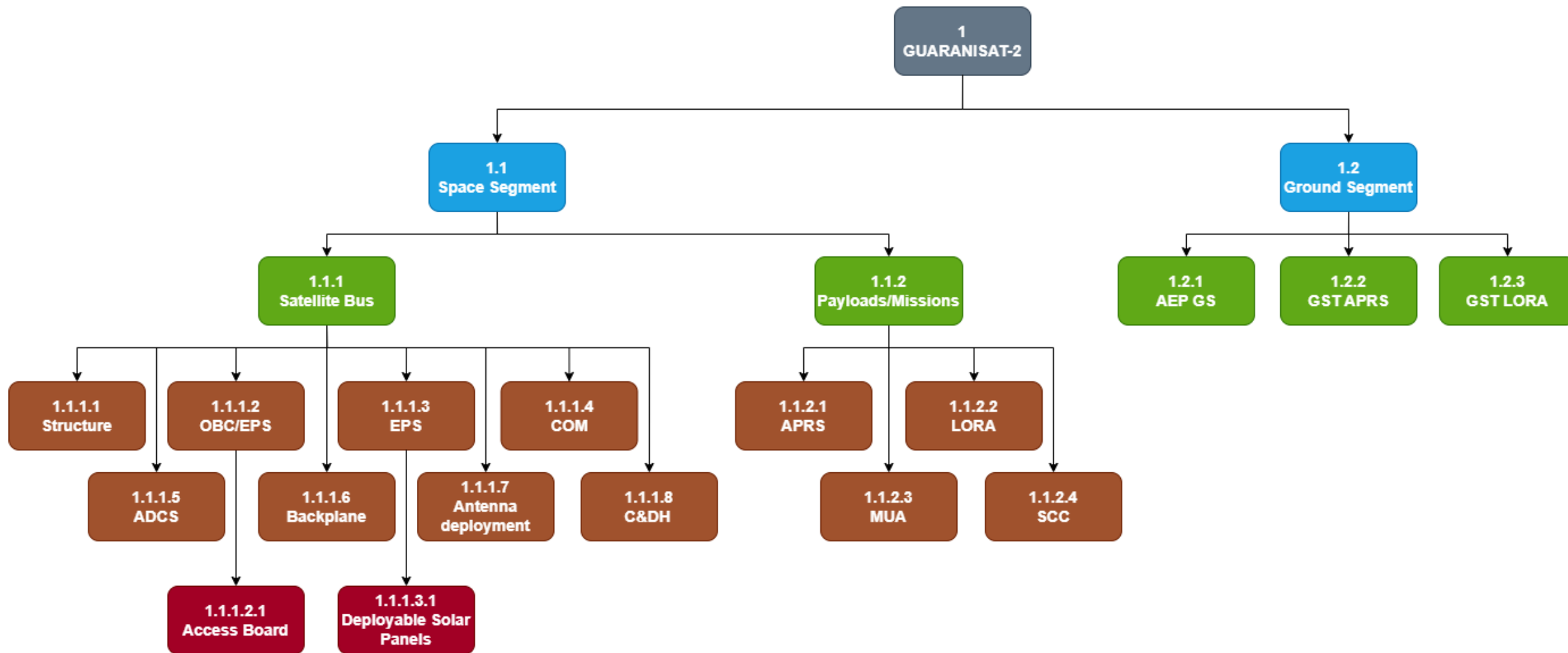


All together...
Is possible!!

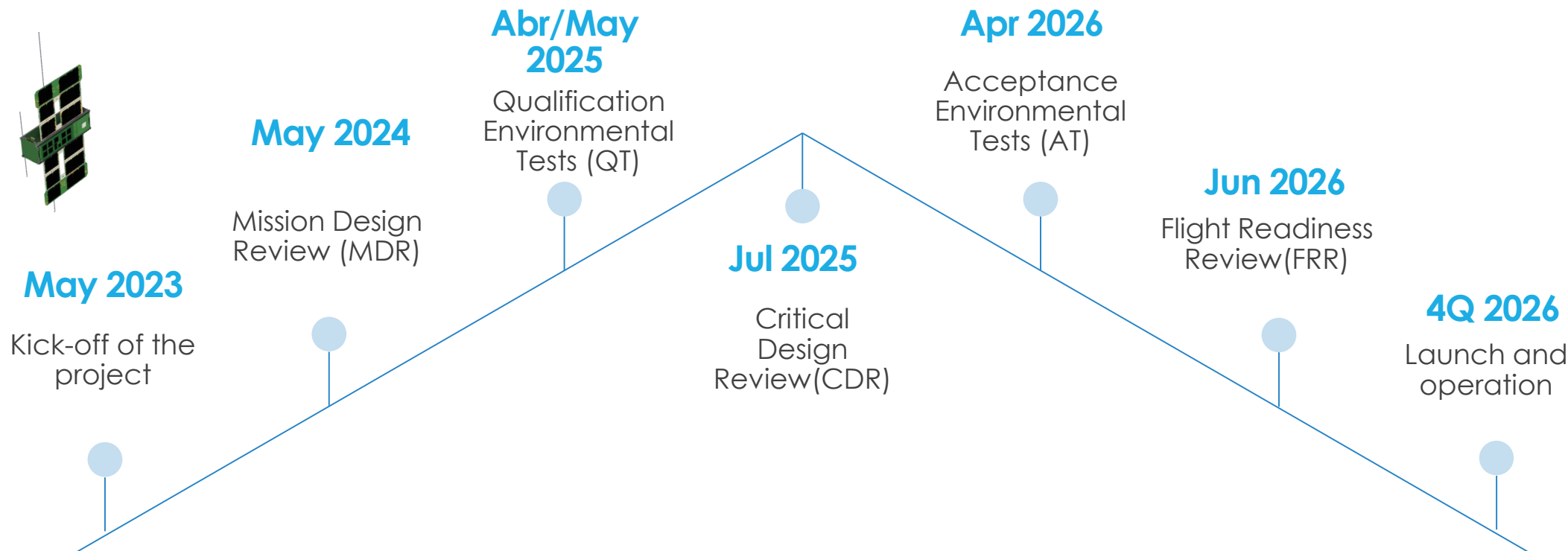


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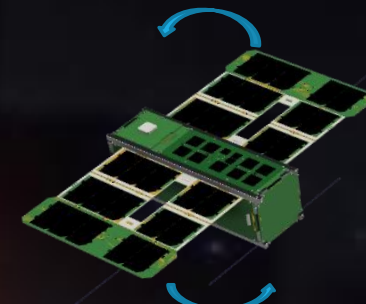
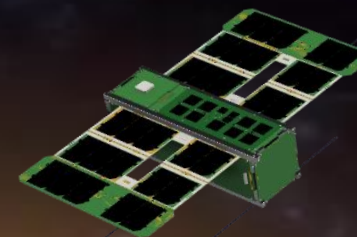
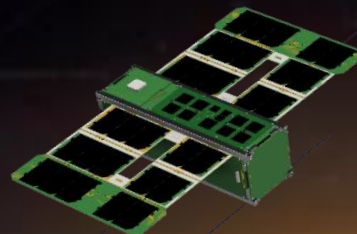
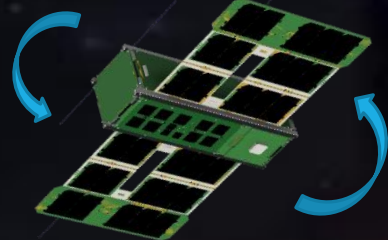
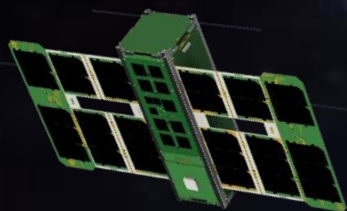
Product Breakdown Structure (PBS)



Timeline



Modes of operation



Initial mode after deployment from rocket:

- Photo capture (if battery > 7.2V?)*
- ADCS sensors ON
- Batt heater AUTO
- Antenna deployment (after 30 min)*
- Transmit UHF CW/Tx
- Solar panel deployment (if gyro < 30°/s, battery > 7.2V)*

Detumbling mode: *Activated after initial mode (by command)*

- ADCS sensors ON
- Confirm battery!!
- Batt heater AUTO
- iMTQ ON (by command)
- C&DH ON

Nominal mode:

- Transmit UHF CW/Tx
- Batt heater AUTO
- ADCS sensors ON
- iMTQ OFF
- GPS ON
- Receive UHF GMSK/Rx
- C&DH ON

UHF TX mode (10~12 minutes duration): *Activated when telemetry is downloaded*

- Receive UHF GMSK/Rx
- Transmit UHF GMSK Tx ON
- Batt heater AUTO
- ADCS sensors ON
- iMTQ OFF
- GPS ON

Safe mode: *Activated when power generation is low*

- Receive UHF GMSK/Rx
- Transmit UHF CW/Tx (every 6 minutes, only CW type 1*)
- Batt heater AUTO
- ADCS sensors OFF
- iMTQ OFF
- GPS OFF

Amateur missions mode *Activated for amateur mission (APRS or LORA)*

- Transmit UHF CW/Tx
- Batt heater AUTO
- Mission ON
- ADCS sensors ON
- iMTQ OFF
- GPS ON

Educational missions mode

Activated for educational mission (MUA or JPL)

- Transmit UHF CW/Tx
- Batt heater AUTO
- Mission ON
- ADCS sensors ON
- iMTQ OFF
- GPS ON