CUBESAT PORTUGAL

RULES AND REQUIREMENTS

CUBESAT PORTUGAL

PORTUGUESE SPACE AGENCY

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1. Introduction

The Portuguese Space Agency promotes CubeSat Portugal, an initiative that encourages university level students to design and build their own (small) satellites. It is widely recognized that such competitions foster innovation and motivate students to extend themselves beyond the classroom, while learning to work as a team, solving real world problems under the same pressures they will experience in their future careers.

In this case, dealing with such a complex system as a satellite, which requires a variety of subsystems to operate effectively, allows the students to understand how their knowledge can be applied to develop and operate each subsystem and use them to study and explore Earth or the Universe. The experience and knowledge acquired are easily transferable to other sectors and applications, such as renewable energy systems, robotics, autonomous vehicles control, materials for extreme environments or communication systems.

CubeSat Portugal is fully aligned with the strategic goals of the Portuguese Space Agency, namely the development and evolution of the cultural/educational internationalization frameworks capable of boosting the development of the Space sector in Portugal.

All in all, CubeSat Portugal is a New Space project with the goal of building capacity and fostering connections between students and the industry. The team shall approach this challenge with New Space in mind, aiming to innovate and provide creative engineering solutions on their projects.

This document defines the rules and requirements governing participation in CubeSat Portugal. Revisions of this document will be accomplished by document reissue, marked by the version number. The authority to approve and issue revised versions of this document rests with the Portuguese Space Agency.

The CubeSat Portugal initiative has the support of D-Orbit as an Industry partner.

2. Team Composition and Eligibility

CubeSat Portugal teams shall consist of an unlimited number of students who are currently enrolled in a bachelor's or master's degree in a Portuguese Higher Education Institution, from one or more academic institutions (e.g., "joint teams" are eligible and encouraged). Teams may invite advisory members (such as doctorate students, professors and/or industry professionals), as long as the number of advisors does not surpass 20% of the total number of team members.

When applying to CubeSat Portugal, each team shall appoint a team leader, who must be the point of contact with the Portuguese Space Agency for all matters. Furthermore, the team leader should be responsible for disclosing and sharing all the information provided by the organisation to the remaining team.

In their deliverables, teams are encouraged to present all team members and advisors and their assigned task/role, namely all the subsequent team leaders. Team members and advisors can be changed as the team sees fit during the project duration. All changes in the team leadership shall be immediately reported to the Portuguese Space Agency through the channels dedicated to CubeSat Portugal.

Please note that each team may apply with only one project to CubeSat Portugal, and each team member may only participate in one CubeSat Portugal project. Faculty and Industry advisors are not considered team members.

As stated previously, joint teams are encouraged, including members with different academic backgrounds. Since this initiative intends to promote a New Space approach, teams are advised to incorporate members with business, marketing and/or media backgrounds to build business models, promote the team, perform outreach activities and presentations with the ultimate goal of getting sponsors/partners for the project.

3. Application and Registration Processes

3.1. Entry Form

Each team shall apply to CubeSat Portugal on the CubeSat Portugal page on the Portuguese Space Agency website. Total completeness of the entry form is required, along with the submission of an Academic Institution Participation Letter and Student University Identification for all team members. Please refer to section 4.1 for the complete information on the registration process and entry form.

3.2. Academic Institution Participation Letter

Each team is required to ask the academic institution(s), in which its members are enrolled, to provide a signed letter when applying to CubeSat Portugal, acknowledging the team as the institution's representative and its intention to participate in the event. The signatory shall be a senior faculty member or senior staff representative (e.g., professor).

In the case of a joint team, comprised of students from multiple academic institutions, each affiliated institution must provide its own signed letter to the team mentioning only the members enrolled in that same institution (and not all the team members).

The Academic Institution Letter template is available for download on the CubeSat Portugal website.

3.3. Student University Identification

Each team shall submit copies of documents proving that all team members are eligible – i.e., team members are either currently enrolled in a bachelor's or master's degree.

The accepted documents as student identification proof are:

- Student card, with valid expiration date.
- Certificate of enrolment issued by the academic institution.
- A print screen of the student personal area from the academic institution website that clearly shows that the team member is enrolled or was enrolled during the previous academic year.

Each team member must choose only one of the above documents.

3.4. Team ID

The Team ID is the competition officials' primary means of identifying and tracking the teams. Once assigned, any correspondence between a team and the organisers must contain the respective team's ID number to enable a timely and accurate response. In the entry form, teams can indicate a short name or acronym for easier identification. All documents onwards shall include the ID and be named in the following pattern:

CubeSat Portugal or CSP + ID No + Team Acronym, resulting in, for example:

- CSP-1-PTS
- CSP-1-PTS_Project Report
- CSP-1-PTS_CriticalDesignReview or CSP-1-PTS_CDR or similar

4. Phases and Deliverables

The format of this initiative intends to mimic the different phases associated with space missions (from Phase 0 to Phase E through the different phases), with the necessary adaptations. This section describes what is expected in each phase and the corresponding CubeSat Portugal Phases and mandatory deliverables. The following table provides a summary of the descriptions detailed in the subsequent subsections:

Phase	Typical Space Mission	CubeSat Portugal
0 – Mission Analysis and Identification	Identify the mission needs, mission and performance goals, safety and operations constraints. Create initial technical requirements specification. Finished after the Mission Definition Review (MDR).	<u>Registration</u> • Team Composition, including team structure and brief team introduction ▪ Concept Report ▪ One minute video about the team ▪ Submission of the Academic Institution Participation Letter and Student University Identification
A - Feasibility	Production of initial technical designs, management plan, system engineering plan, product assurance plan. Assess feasibility – implementation, programmatic, cost, operations, organisation, production, maintenance, disposal, etc. Assess risks. Release final technical requirements specification. Finished after the Preliminary Requirements Review (PRR).	<u>Phase AB</u> • Team composition, participating institutions, partners, and sponsors. • Primary and secondary mission objectives definition. • ConOps • Management plan with: Budget (including funding sources), timeline and Business and/or Legacy proposal • Summary of Mission requirements • Preliminary Design Report (PDR) • Risk Assessment • Preliminary Mission and System Requirement document. • Critical Design Report (CDR) **EVALUATION PHASE / REVIEW** Possibility to reorganize teams to follow through to the next phase.
B – Preliminary Definition	Finalise plans, decide on hardware models, define schedule: ▪ Trade-off studies to decide on preferred solutions ▪ Develop design, start procurement of long-lead items (some electronic components have lead times of over 1 year) ▪ Spacecraft side – Systems Requirements Review ▪ Finished after the Preliminary Design Review (PDR)	
C – Detailed Definition	Finalise the design. Detailed definition of interfaces: ▪ Build engineering models ▪ Development testing ▪ Planning for assembly, integration, verification, and testing (AIV/T) ▪ Start writing the User Manual ▪ Finished after the Critical Design Review (CDR)	<u>Phase CD</u> • Engineering Model (EM). • Operations Manual, including Ground segment (OM). • Updated Progress report. • Updated Critical Design Report (CDR). • Risk assessment.

D – Qualification and Production	Build qualification hardware. Complete qualification testing and verification activities. Hold Qualification Review (QR). Build flight hardware. Complete acceptance testing and authorize delivery. Finished after the Flight Acceptance Review (FAR) and Operational Readiness Review (ORR)	• Mission and System Requirement Document. • Verification and Validation for flight plan, including all the outputs from tests already performed at the subsystem and system level. • End-of-Life and disposal protocol/measures. **Phase CD ends with the selection of 1 satellite to be launched**
E - Utilisation	Flight Readiness Review (FRR). Launch Readiness Review (LRR) and launch. Commissioning and Commissioning Result Review (CRR). Operation. Ground segment activities. Finished after End-of-Life Review (ELR).	**Flight Model (FM)** **All tasks required by phase E**
F – Disposal	Finished after Mission Close-out Review (MCR)	

The mandatory deliverables mentioned in this table and detailed in the sections below shall be completed to qualify for the flight opportunity and to enter competition scoring.

4.1. Phase 0 – Mission Analysis and Identification | Registration (P0)

Phase 0 marks the kick-off of the competition. In this phase, teams must provide a detailed team description, which is expected to be well balanced and multidisciplinary. Furthermore, while there is still opportunity for adjustments, it is important to provide a detailed description of the project and its goals, while highlighting possible or already established partnerships.

The following deliverables are to be provided in the moment of registration (total completeness of the entry form is required):

- Team Composition (PoC), team structure and brief team introduction and institutions involved (max 3 pages);
- Concept Report (maximum **20 pages**), including:
  - Summary of goal definition (what does the team expect to accomplish with the project);
  - Summary of Primary Mission (See section 5.1);
  - Summary of Secondary Mission (See section 5.2);

  - Distinctive and unique characteristics (if any; drawings are welcomed to make sure teams explicitly point out any special proposed design features that the officials should be aware of);
  - Expected difficulties and criticalities.
- One minute video about the team, their project and expectations. The video presentation should preferably be recorded vertically in order to better fit the social media content format. The video shall be accompanied by a short team bio (maximum 300 characters). A team logo can be uploaded alongside the video presentation in the registration form.
- Submission of the Academic Institution Participation Letter and Student University Identification (required for all team members).

4.2. Phase AB (PAB) – Initial Reporting and Documentation for Approval

Phase AB will culminate in the delivery of the initial Project Report, along with other relevant project deliverables. Each team shall submit a report in pdf format with a maximum of **50 pages** (reports will not be evaluated further), including cover, index and figures (must not exceed **20 Megabytes** in size). Technical schematics and diagrams that are not relevant to showcase major points should only be included in the Mission System and Requirements or Preliminary Design Report documents.
Documents formatting, size and style are responsibility of each team, but should focus on readability and coherence. The appendices can have additional information but are not necessarily read in detail by the officials, thus teams are highly recommended to maintain them concise.

As mentioned in section 3.4 Team ID, the documentation shall follow a strict naming guidelines.

The initial Project Report must contain an overview of the project, including the following sections:

- Team composition, along with participating institutions, partners, and sponsors.
- Primary and secondary mission objectives definition.
- Concept of Operations (ConOps).
- Management plan:
  - Budget (including funding sources)
  - Project timeline
  - Business and/or Legacy proposal
- Summary of Mission requirements.
- Preliminary Design Report (PDR).
- Risk Assessment.

Additional sections, subsections, and appendices may be added if needed. Furthermore, along with the initial Project Report, the team should also deliver the following technical documents:

- Preliminary Mission and System Requirement document.
- Critical Design Report (CDR).

All documents should be as comprehensive as possible, including all the schematics, diagrams, and key project features well detailed and explained in a technical and concise manner. A team designated by the Portuguese Space Agency will evaluate all the documentation submitted, providing feedback and recommendations for each project.

The approved projects move onto Phase CD and will receive the CubeSat skeleton that must be used in satellite development. The projects that don't meet the requirements will be held in PAB until the requirements thresholds are met. If the team is held the dates of the following Phase (PCD) will not be changed. A date for a new evaluation (which can only happen once) will be coordinated with each team.

The project itself cannot be changed from this point onward. Teams delivering a project considerably different from the approved design will not be considered for the final evaluation.

Templates for the deliverables will be provided.

Deliverables

Mission and System Requirement document (MSR)

Mission requirements define the mission to be completed, including the System and Subsystem requirements. System requirements describe the function, environment, context, and performance, within which the CubeSat must work and subsystem detailed designs (including its physical characteristics and functional features). This document must comply with national and international regulations.

Critical Design Report (CDR)

Critical Design Report establishes the initial baseline of the CubeSat. It must include a timeline for manufacturing, assembly, integration, validation and testing of the EM. It shall also include a systems design report with the electrical architecture, components, and their interfaces and how the data is processed within the CubeSat, transferred to the ground station, collected, and stored.

4.3. Phase CD (PCD)

In PCD, teams are intended to finalize the design and build an Engineering Model (EM) satellite. In this phase teams shall re-adjust their designs based on the feedback of the PAB. Phase CD is the longest in the Cubesat Portugal initiathe teams shall provide detailed documentation provided by the teams including the design and definition of the subsystems, EM assembling and testing, implying a higher level of complexity. At the end of this phase teams should submit the following:

- Engineering Model (EM).
- Operations Manual, including Ground segment (OM).
- Progress report.
- Updated Critical Design Report (CDR).
- Risk assessment.

- Mission and System Requirement Document.
- Verification and Validation for flight plan, including all the outputs from tests already performed at the subsystem and system level.
- End-of-Life and disposal protocol/measures.

All documentation is to be submitted via the CSP email in PDF format. Other submission formats can be requested (for example, a hard copy sent by post), but this will be communicated to the teams in a timely manner, along with all necessary details.

Templates for the deliverables will be provided.

Deliverables

Engineering Model (EM)

Teams shall deliver a fully functional EM satellite based on their design. This includes components used and design features. Refer to Section 5 for more detailed requirements of the EM.

Operations Manual (OM)

This document shall provide clear instructions on how a user can operate the satellite before and after deployment. This document must include:

- Detailed ConOps
- General configuration of the System
- Lay out for power-up, reset and shutdown
- Walkthrough of normal event sequence
- Step-by-step instructions
- List of common/known errors and their resolutions

All the steps must include written instructions and can include visual information for better understanding.

Example 1:

System Power-Up instructions:

Step 1. Run CSP-1-PTS.exe on the ground station/computer and wait until “Stand by for receiving” is written on the screen.
Step 2. With the satellite in the position seen in image X. press for 3 seconds the button PWR
(…)

Example 2:

Know error list:

Error 1. [ERROR NAME]

```
NameError: name 'variable' is not defined on line 2
```

Description

This error occurs when…

To Fix/Resolution

To solve this error you must…

Example 3:

Step-up ground station

Step 1. Unbox the parts labelled 1 to 10
Step 2. With a flat head screwdriver…

Insert example image

Verification and Validation for Flight Plan

Detailed report of all the tests done by the team to prove that their system is flight ready.

End-of-Life and Disposal Protocol

This documentation must detail the orbital decay of the satellite and mitigation measures, namely what will be the mechanism implemented for removing the satellite from the operational region ensuring that the CubeSat will be in an inert state, not being capable of transmitting/receiving RF communications and not capable of an generating an explosive event, releasing debris. Calculations for how long the satellite will remain in orbit at this state, with the relevant simulations, are requested.

4.4. Final Selection and Flight preparation

For the final selection, teams will have to submit all the required documentation stated (section 4.3.). After all the documents are successfully submitted, teams will be invited to participate in a **CubeSat Portugal** event where they will showcase their projects. A team designated by the Portuguese Space Agency, will evaluate

all the documentation submitted and participate in the showcase event, to complete the evaluation process, following the Evaluation Guidelines.

The EM must be handed over to the Portuguese Space Agency, after the showcase event and until the selection process is complete.

The evaluation process will conclude with the selection of the winning team, which will go on to prepare the satellite for launch.

More information about the ***CubeSat Portugal event and the Winner Announcement*** will be provided to the teams via email, as well as on the CubeSat Portugal page on Portuguese Space Agency's website and its social media accounts.

Flight Preparation

The team selected as the winner of the competition will have the opportunity to launch their satellite. The flight opportunity is arranged by the Portuguese Space Agency.

The flight is not guaranteed and will depend on the work of the team to adjust the to launch conditions, space conditions and for the satellite to pass all the tests and meet the requirements defined by the Portuguese Space Agency team, the launch provider, and international standards. Both National and International Rules and Regulations apply.

The launch date is dependent on all positive test results, the final assessment of the project done by the launch provider and an available date for the launch.

4.5 Workshops

In order to promote and motivate teams to learn, research, exchange and interact with each other and relevant stakeholders, the Portuguese Space Agency will promote a series of workshops between the registration and the Phase CD deadline. More information will be disclosed by e-mail for the teams participating, including accessing conditions and limits on team members attending. Teams can also propose workshops on other topics or subjects.

Workshop 1 – CubeSat Structure and Architecture
Workshop 2 – CubeSat Subsystem Architecture
Workshop 3 – Tests and Launch
Workshop 4 – Flight Ops and Ground Segment

Below you can find a summarized timeline of the CubeSat Portugal initiative:

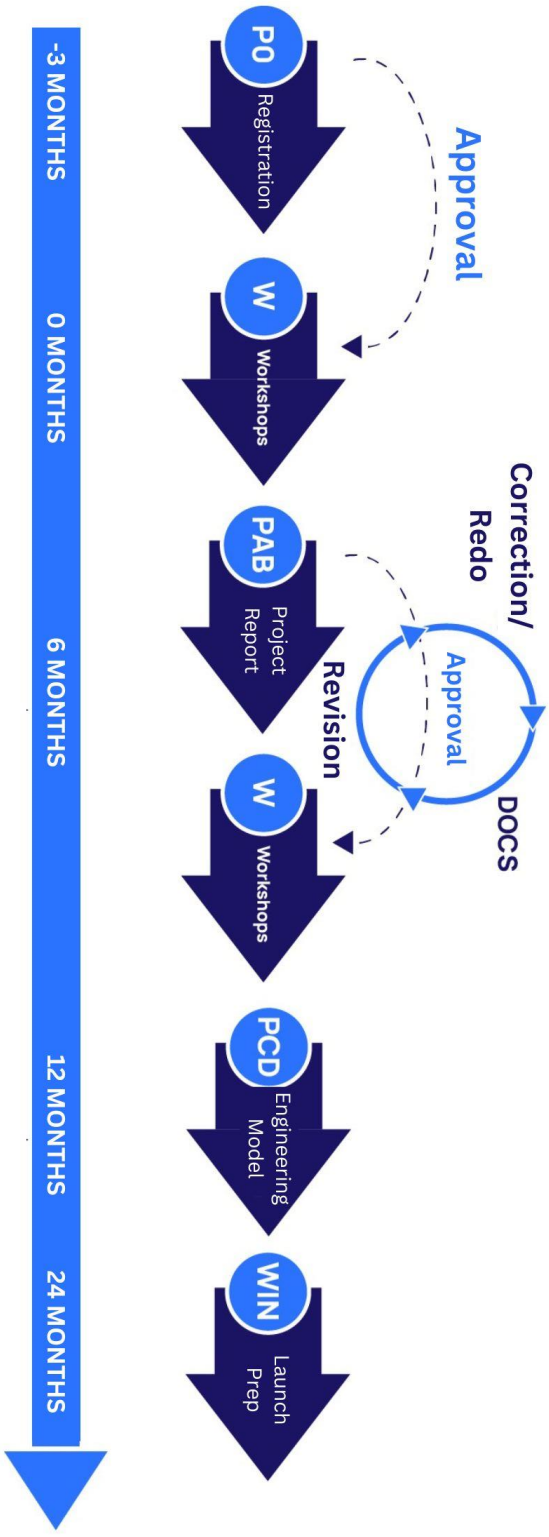

Figure 1 - Timeline of CSP

5. Mission, Subsystems, and Requirements

The CubeSat Portugal challenge is meant to foster innovation, along with practical knowledge following a New Space approach. The satellite designed shall obey certain pre-defined standards detailed throughout this section. The following subsections highlight design and engineering choices that must be considered. Although not everything is listed for the evaluation, these specific requirements will be addressed first, before delving directly into the team specific design or other features. Teams shall fulfill all requirements for the primary mission and shall include a secondary mission in their respective CubeSats.

For clarity and coherence purposes please refer to this definition of key words, throughout the next pages:

Shall
Denotes mandatory requirements.
Failure to satisfy the spirit and intent of a mandatory requirement will always affect a project's score and flight status negatively.

Should
Denotes non-mandatory goals.
Failure to satisfy the spirit and intent of a non-mandatory goal may affect a project's score and flight status, depending on design implementation and the team's ability to provide thorough documentary evidence of their due diligence on-demand. Compliance with recommended goals and requirements may impact a team's score and flight status in a positive way, as demonstrating additional commitment and diligence to implement (often safety and reliability related guidelines) is commendable.

Will
States facts and declarations of purpose.
These statements are used to clarify the spirit and intent of requirements and goals.

5.1. Primary Mission requirements

The Primary Mission (PM) defines the minimum requirements expected for all teams to fulfill. These requirements are defined by the CubeSat Portugal organization and serve has a baseline to evaluate all the work done by teams. These requirements consider the assembly process, launch and deployment of the Engineering Model/Pre-Flight Model. Showcasing these requirements is mandatory and should be properly highlighted in all the documentation provided and when presented to the organisation.

The approved projects move onto Phase CD and will receive the CubeSat skeleton that must be used in satellite development. **All the teams must assemble their CubeSat using this structure**. Technical information and *CAD* files on the structure will be made available.

Structure and Hardware

- The CubeSat shall have a form factor of 1U – 100x100x100 mm.

- The CubeSat shall have a mass no larger than 1330 g (1.33 kg).
- The Total Mass Loss (TML) shall be inferior to 1% of Total Mass.
- The center of mass (CM) and the geometric center shall be aligned in X, Y and Z axis with a +/- 2 cm freedom degree on each axis.
- Components and operations shall fulfil national and international regulations and standards, including:
    - ITU Radio Regulation;
    - Hazard/dangerous materials descriptions and mitigation features;
    - The International Standards Organization (ISO) standards catalogue;
    - The Institute of Electrical and Electronics Engineers standards (IEEE).

As reference consult: The European Space Components Information Exchange System (ESCIES) and The European Preferred Parts List (EPPL).

- During launch, ejection, and operations all the parts shall remain attached to the CubeSat.
- The CubeSat shall incorporate redundancy systems:
    a. If the CubeSat contains a propulsion mechanism, it shall have more than 2 different activation methods and clear indication that propulsion has been activated.
- CubeSat shall incorporate low out-gassing materials and components.
- Passive magnets shall have a limited magnetic field, outside the static envelop (0.5 Gauss above Earth Magnetic Field).
- The CubeSat Attitude and Control Systems shall estimate the position within an error margin of 100 m and attitude of 3 degrees.
- All components shall undergo vibration tests.
- The CubeSat shall incorporate adequate venting. The peak pressure with volume, during launch, should be inferior to 0.034 Bar (0.5 psi).
- All components should undergo Thermal Vacuum tests:
    a. This test will also be performed for Launch preparation. Teams should justify in the documentation, with reasoned arguments in case they are not able to provide this test result in PCD.

- The CubeSat shall have a coordinate system, located at its geometric center. Refer to Figure 2.

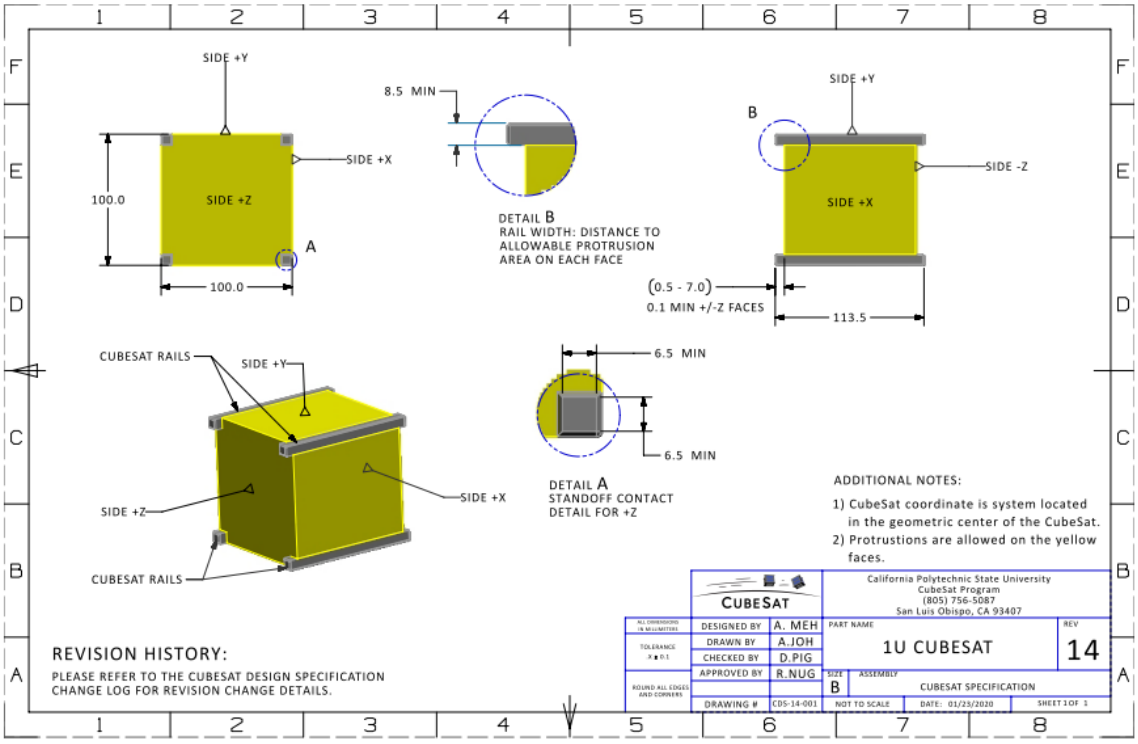

Figure 2 - CubeSat Schematic – credits: CubeSat Design Specification Rev. 14.1 The CubeSat Program, Cal Poly SLO

- The +Z side will be inserted first into the dispenser.
- The margin inside the dispenser is approximately 6.5 mm, therefore no component should ideally protrude more than the defined 1U dimension.
- CubeSat shall incorporate at least 2 deployment switches.

ConOps

- The CubeSat shall have at least 3 possible **LEO** orbits, with one highlighted as the preferred.
- The orbit should be completely defined in the following parameters:
  - Movement (posigrade or retrograde).
  - Height (between 450 and 550 km)
  - Velocity (estimated)
  - Angle Inclination
  - Angle Elevation
  - Orbital period
  - Excentricity
- CubeSat should incorporate design for demise features (end-of-life).
- The team shall provide calculations with Life Span estimation and Orbital decay simulation.
- The CubeSat shall have a dedicated ground station.

5.2. Secondary Mission Objectives

The EM shall be designed with the Secondary Mission requirements in mind.

Teams should keep in mind their legacy after launching the CubeSat, which will remain operational for a certain period.

In the documentation provided, teams should explain how they will ensure that students will stay focused on the project; if and how the project will be a business opportunity; if and how the CubeSat will provide relevant information to students in certain areas. All these and other relevant questions should be considered and clarified in the documentation.

All the payloads should be incorporated with the requirements established in 5.1.

5.3. Power and electronics

Power and electronics shall implement and be designed ensuring compliance with the following features:

- To prevent CubeSat activating/powering during launch and pre-deployment operations, the CubeSat power system shall be always at a power-off state and only powering 45 min after deployment.
- The CubeSat shall have, at least, 2 deployment switches. The switches are actuated while integrated in the dispenser.
- While in the actuated state, the CubeSat shall electrically disconnect the power system from the powered functions.
- The switch shall not damage or interfere with the contacting surface.
- In case the deployment switch is rapidly switched from the actuated state and back, the CubeSat shall reset to pre-launch state, resetting all transmission and deployable timers.
- If CubeSat incorporates Real Time Clocks (RTC), the circuits shall be isolated from CubeSat's main power system:
    - RTC frequencies shall be hard limited to less than 320 kHz.
    - RTC circuits shall be current limited to less than 10 mA.
- The CubeSat shall include a Remove Before Flight (RBF) pin, which cuts all power to the satellite once it is inserted into the dispenser.
- The RBF pin shall protrude no more than 6.5 mm from the CubeSat rail surface.
- CubeSats shall incorporate battery circuit protection for charging/discharging.
- CubeSat shall include inhibits between a power source and a hazard. Properly highlighted in the risk assessment.

5.4. Communications

Regarding communications, teams are encouraged to integrate members with Amateur Radio license.
The CubeSat and ground station shall comply with the following:

- The CubeSat shall have an independent RF inhibit to prohibit inadvertent RF transmission.

- CubeSats shall not generate or transmit a signal during at least the 45 minutes after on-orbit deployment.
- For amateur frequency, it is required proof of frequency coordination by the IARU.
- CubeSats and ground station shall comply with their country's radio license agreements and restrictions.
- Ground station operators should refer to current legislation in terms of what licenses and approvals are needed. If teams need more information, please contact the Portuguese Space Agency.
- Ground station should have defined uplink and downlink scheduling.
- All data comms from the ground station to the satellite should be secure and encrypted to prevent hacking.

5.5. Environment and Operations

Regarding space environment and operations constrains, the teams shall consider the following:

- CubeSat mission design and hardware shall be designed to limit orbital debris.
- Forced or orbital decay, re-entries shall be inferior to 15 Joules.
- All deployable components such as booms, antennas, and solar panels shall wait to deploy a minimum of 45 minutes after the CubeSat's deployment switch(es) are activated during dispenser ejection.
- Teams shall provide clarification on materials used and their expected behaviour upon re-entry with focus on their demise.

5.6. End-of-Life

Due to Space Debris concerns, teams shall consider disposal/end-of-life mechanisms or debris mitigation features for their CubeSats. The CubeSat should have a probability of successful disposal larger than 90%, according to New Space Debris Mitigation Policy. Teams should refer to the UNOOSA (United Nations Office for Outer Space Affairs) Guidelines for more information.

6. Evaluation Criteria

Teams will be evaluated in five different scoring categories:

Table 1: Weight of the scoring categories.

Scoring Category	Possible Points	Minimum Points	% of Total Points
1. Technical Report	100	60	10%
2. CubeSat Design	250	150	25%
3. Documentation	250	150	25%
4. Engineering Model	300	150	30%
5. Secondary Mission	100	50	10%
TOTAL:	1000		100%

To be eligible as competition winner, a team needs to score at least 600 total out of 1000 possible points. The team with the highest score is selected as the winner if it scored the minimum in each category.

If no team meets these criteria, the challenge will be extended for 6 months, when another evaluation will take place. If no team meets the minimum again, the challenge shall end with a Winner selected but without any approval for flight. In this case, the team with the highest overall score will be the winner and no minimum score in each category will be applied.

Each team score (overall and in each category) will be made public.
The winning team shall be publicly announced. Teams are invited to attend and will receive details in a timely manner via email, through the CubeSat Portugal page on the Portuguese Space Agency's website and its social media accounts.

A jury selected by the Portuguese Space Agency, including elements from D-Orbit will evaluate all the projects.

The Technical Report

100 possible points.
Minimum score, 60 points.

The technical report will be evaluated in the following aspects: mission concept, required/mandatory information, coherence both stylistically and linguistically, usage of scientific and technical correctness. Please refer to Chapter 4, for more information on the technical report.

CubeSat Design

250 possible points.
Minimum score, 100 points.

The CubeSat Design evaluates the overall technical design and engineering solutions for the CubeSat. It also considers all the technical details from ConOps to End-of-Life, including ground station. This is evaluated through the technical documentation provided by the teams.

Documentation

250 possible points.
Minimum score, 150 points.

It evaluates if all the required documents contain the necessary information, coherence both stylistically and linguistically, usage of scientific and technical correctness, simple and concise explanations with schematics and technical drawings whenever necessary and the explanation for key features.

Engineering Model

300 possible points.
Minimum score, 150 points.

It evaluates the team's capacity to translate from the concept and design to reality and the quality of the engineering. In this item all aspects from manufacturing to assembly and ability to solve physical constraints are considered.

Secondary Mission

100 possible points
Minimum score, 50 points.

It evaluates the goals and objectives of the secondary mission, the scientific and technical significance of the proposed experience or the team's capacity to communicate a New Space project, as a business with long-term ambitions and business model. It includes outcomes whether in business or faculty legacy.

7. Non-technical deliverables and organizational matters

7.1. Insurance

The Engineering Model should be properly insured by the team. A proof of insurance must be handed before showcasing and delivering the EM to the Portuguese Space Agency. The Third-Party Liability insurance is highly recommended for all teams and should provide coverage of potential litigation directly involving the Engineering Model. To be protected against Third Party claims and Accidents, teams can benefit from coverages from their college or university insurances, or the teams can acquire specific insurance covering the project will being manufactured or at the hand-over process.

7.2. Questions regarding evaluation

Teams are welcome to approach the organisation to ask for specific, non-binding feedback regarding their perception of the teams' work during all points with the goal of providing the teams with an opportunity to learn and improve.

In case the teams have more detailed questions or specific complaints regarding the scoring after it has been announced (such as requesting elaborate feedback on a particular aspect of the score for clarification or pointing out specific situations), the following process applies: the team leader must submit a written feedback request once to *info@cubesatportugal.pt* . Requests for feedback are accepted until no later than one week (7 days) after official results announcement. The Portuguese Space Agency and selected experts will gather to review the complaint and will reply by writing via the same communication channel.

If an honest mistake in scoring is apparent, competition officials will review the score provided to the team and decide on a case-by-case basis if and how to account for this, especially and only if this identified mistake would significantly affect the overall score and competition results.
It should be noted that teams are expected not to abuse this opportunity for questions/feedback/complaints, as officials will not partake in discussions that question the overall reasoning of the score given.

7.3. Disqualification and Withdrawal

If a team falls into any of the categories stated in this section, it becomes eligible for expulsion/disqualification from the competition. CSP organisers reserve the right to assess any misconduct/mismanagement case by case and to take the necessary proper actions leading to disqualification of specific team members or the entire team.

Grounds for disqualification can include failure to meet the defining CSP requirements as recorded in this document and failure to submit a Technical Report (or otherwise failing to provide adequate project details in required deliverables).

Teams that fail to deliver the required documentation in the deadlines defined by the organization, also incur into penalty in their evaluation.

Teams will be penalized for every instance of unsportsmanlike conduct or false information recorded by officials, including, but not limited to, the following examples:

a. Lack of respect for any member of the organisation.
b. Plagiarism.
c. Sabotage of the work of another team.
d. False information in any the mandatory documentation, (including letter from the faculty or team member data).

Teams can withdraw from CSP at any time. The only required formality is an e-mail from the team leader to the organisation with the subject “TEAM ID WITHDRAWAL from CSP” and with the faculty advisors CC’d as well as any other relevant team members. The e-mail should summarise the motives behind the withdrawal. The team shall expect a reply from the organization stating its acknowledgement.

8. Information and dissemination of supported projects

All project activities directly or indirectly supported or funded by the Portuguese Space Agency within the scope of CubeSat Portugal, such as communications, publications, mainly scientific, must include a reference to the Portuguese Space Agency. Likewise, the logo of the Portuguese Space Agency, as well as that of CubeSat Portugal, must be included in the documents relating to the selected projects.

9. Non-discrimination policy

The Portuguese Space Agency promotes a policy of non-discrimination and equitable access. Consequently, no student should be favoured, benefited, punished, or deprived of any right or exempted from any obligation. This includes origin, age, gender, sexual orientation, marital status, family situation, economic situation, education, social status, genetic inheritance, incapacity for work, chronic illness, nationality, ethnicity and race, language, religion, political or religious beliefs or syndicate membership.