

SWISS CANSAT 2023

CANSAT COMPETITION FOR SWISS HIGH SCHOOLS

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Swiss cansat organization team

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INTRODUCTION

The SwissCanSat competition is an educational initiative for teams of Swiss secondary school students to design, build, and launch their own miniature satellite, to ensure the availability of a highly qualified workforce in the space (but not only!) industry of the future. The challenge for the students is to fit all the major subsystems found in a satellite, such as power, sensors, and a communication system, within the volume and shape of soft drinks can.

The CanSat is launched by either an aerostatic balloon or an unmanned drone to an altitude of less than one kilometer. The CanSat mission starts from that altitude carrying out a scientific experiment and/or a technology demonstration, achieving a safe landing, and analyzing the data collected.

Scientists and engineers need to work together to create the best satellite design. Here, you will find the outline of your **missions** and hints to the hardware components you should include.

The team must build a CanSat and program it to accomplish the compulsory **primary mission**:

- After the release and during descent, the CanSat shall measure Air temperature and Air pressure at least once every second:

The **secondary mission** of the CanSat must be selected by the team. Teams can take ideas from real satellite missions or collect scientific data for a specific project, make a technology demonstration for a student-designed component, or any other mission that would fit inside the CanSat and show its capabilities. Teams are invited to take inspiration [ESA's missions](#) for designing their own secondary missions, which could form the basis of a real space mission! Teams should also keep in mind the limitations and requirements of the CanSat mission, and consider the feasibility (both technical and administrative, in terms of time and budget) of their chosen mission. The teams should bear in mind that the scientific value of the secondary mission participates to the competition's overall score.

Through the CanSat project, the participating student teams experience all the phases of a real space project, from selecting the mission objectives, designing their CanSat, integrating the components, testing the system, preparing for launch, and analyzing the scientific data obtained. Throughout this process, the students will:

- Learn by doing;
- Get acquainted with the inquiry-based methodology that is typical of real-life scientific and technical professions;
- Acquire and/or reinforce their skills concerning fundamental technology, physics and programming.
- Understand the importance of coordination and teamwork;
- Enhance their communication skills.

Please note that English is the official language for written reports and oral presentations as for the European CanSat Competition.

Participation is free of charge

If you need help for getting started, feel free to contact us through the Website or by email at swisscansat@hes-so.ch. Participants can find further information from the following links:

- SwissCanSat website: <https://www.hes-so.ch/swisscansat>.
- SwissCanSat Wiki: <http://mondzeu.ydns.eu/wikis/cansat>



ELIGIBILITY TO PARTICIPATE

In order for a student team to be accepted into the Swiss competition, the following conditions have to be fulfilled

1. Each student team must comprise a minimum of 4 up to a maximum of 6 students (aged 14 – 20 years old) resident in Switzerland respecting one of the following conditions:
 - Team of students enrolled full-time in a secondary school;
 - Team of students in home schooling condition (certified by the National Ministry of Education or delegated authority);
 - Team of members of a social club enrolled full-time in secondary schools;
2. At least 50% of the students included in a team must be Swiss nationals.
3. University/higher education students cannot participate in this competition
4. Each team needs to be supervised by a teacher or mentor responsible for monitoring the team's technical progress, offering help and advice, and acting as the team's point of contact with SwissCanSat organization team. The Mentor must be available to accompany the team to the competition launch campaign.
5. Each team needs to have a tutor from an Swiss Universities of Applied sciences and arts (UAS)¹ working with the teacher or the mentor responsible of the team.
6. It is forbidden for a team to participate in the SwissCanSat Competition more than once, with the exception of the teacher/mentor and up to one student from any former team.
7. At least one member of the student team should have a working knowledge of English, in order to write reports and give oral presentations in English. It is advantageous that the whole team, including the mentor has a sufficient level of English.
8. It is forbidden for an unregistered person to attend the competition.
9. There may be additional COVID-19 requirements arising from the national regulations. These requirements will be communicated at a later stage

¹ EN University of applied sciences and arts (UAS); FR Haute école spécialisée (HES) ; GE Fachhochschule (FH) ; IT Scuola Universitaria Professionale (SUP)



COMPETITION TIMELINE

The timeline of the competition is shown in the following image with the corresponding key dates for the 2022-23 edition:

Year	2022				2023				
Month	sept	oct	nov	dec	jan	feb	mar	apr	may
Phase 1	1	2	3						
Phase 2			4	5	6		6		
Phase 3							7	8	
ESA CanSat									

Phase 1: Imagine your CanSat and Call for proposal	
Activity/Event (Milestone M#)	Deadline
Call for proposal (M1)	15 September 2022
Deadline for submission (M2)	October 31 st 2022
Announcement to the teams selected (M3)	Early November 2022
Phase 2: Design and Build your CanSat	
Activity/Event (Milestone M#)	Deadline
CanSat workshop for teachers (M4)	November 2022
Submission of the Preliminary Design Review (PDR) (M5)	December 2022
Feedback of PDR to teams	December 2022
Submission of the Critical Design Review (CDR)(M6)	January 2023
Feedback of CDR to teams	February 2023
Submission of the Final Design Report (FDR) (M7)	March 2023
Phase 3: SwissCanSat Launch Campaign and post-flight activities	
Activity/Event (Milestone M#)	Deadline
Preparation of launch campaign(s)	March 2023
Swiss launch campaign(s) (M7)	March 2023
The 'Best SwissCanSat Project' prize will be awarded to the SwissCanSat winner (M8)	April 2023

The exact dates of your year competition will be published in the official [SwissCanSat webpage](#). The participants will be informed in time.

PHASE 1: IMAGINE YOUR CANSAT AND CALL FOR PROPOSAL

Call for proposal: how to apply

Teams must submit their applications through the website www.hes-so.ch/swisscansat as follow:

- The SwissCanSat application form is available on the website www.hes-so.ch/swisscansat by the beginning of September (M1).
- The completed application form has to be sent via the section "Contact Us" on the website www.hes-so.ch/swisscansat, or by email to the following address: swisscansat@hes-so.ch.





- The deadline to submit the application (M2) is Friday 31st October 2022, 23:59 CET.
- When applying, please read our Guidelines carefully.
- The maximum number of students for each team is 6

The teams will be selected by the Jury in according with the criteria described in the section [Scoring](#) of this document. By the beginning of November, all applicant teams will be noticed with the outcome of the selection.

Due to the time constraints and logistics of holding the launch campaign(s), not all teams which apply may be selected. A maximum number of teams is fixed to 25 for the 2022-23 competition.

Teachers' introductory workshops

Before the students start work on their projects, a workshop will be held for the team teachers. The workshop aims at introducing the CanSat concept, demonstrating how the hardware and software work, and allowing teachers to build their own CanSat. For the 2023 competition, these workshops will be accessible online from November 2023 and teachers will be notified by the email indicated in the Application Form.

CanSat Kit

A CanSat kit can be provided to the secondary level teachers if their team is selected and if they want to use it. The following picture shows the breadboard model to implement the primary mission. This implementation comprises the necessary hardware items to be used on the day where the CanSat competition will be presented to the secondary level teachers who will lead the competition groups.

The CanSat kits are freely available for schools. For budgeting purpose, they have a value of 150 CHF. The teams can express their interest to use the kit within the Application Form.

PHASE 2: DESIGN AND BUILD YOUR CANSAT

CanSat construction and test activities

Under the supervision of their teachers, all the teams participating in CanSat will have to carry out technical work on their CanSats, applying the procedures used in the typical lifecycle of a real space project, which are:

- Selection of mission objectives
- Definition of technical requirements necessary to achieve these objectives
- Design of hardware and software
- Reporting
- Design of ground station/ground telecommunication system
- Integration and testing of the CanSat before the launch campaign starts

Professor/tutor from the Universities of Applied Sciences and arts

A professor from a swiss UAS will be chosen and associated to each team. If the team already has a potential tutor, it can mention him/her in the Application Form. Otherwise, the organizers will select and assign one to your team.

Reporting

Each team needs to submit different reports to the national organizers to track the team's progress. These reports are:

- Preliminary Design Review (PDR), M5



- Critical Design Review (CDR), M6
- Final Design Review (FDR), M7

Please check the Annex 1 – Reporting .

Each review must be submitted to SwissCanSat via email swisscansat@hes-so.ch no later than the respective deadlines, before 22:00 CET, with the name of the team and name of the document submitted clearly written in the subject line (e.g., for the CDR, “Team X Critical Design Review”). The document should be attached as a PDF with the following file name format: TeamX_CriticalDesignReview.pdf. The exact deadlines for the review submissions (M5, M6 and M7) will be communicated to the teams after the selection and only to the involved teams.

PHASE 3: LAUNCH YOUR CANSAT - SWISSCANSAT LAUNCH CAMPAIGN AND POST-FLIGHT ACTIVITIES

In order to be eligible for the SwissCanSat launch, the teams will need to have a fully functioning CanSat ready that will have to be delivered to the Payerne aerological station², no later than **March 27th, 2023**.

National Swiss personnel will conduct the launches with the presence of the student teams. An outline of the launch campaign schedule is provided after (subject to modifications):

Day 1	Opening, online presentation of projects to the jury and final integration and technical inspection (by organizers)
Day 2	Launch (by organizers) and recovery operations of CanSats (by teams). About 1 week after Day 1.
Day 3	Online presentation of results by CanSat teams and the awards ceremony in the HES-SO buildings. About 2 weeks after Day 2.

The organizers cannot be held responsible of launch campaign's cancellation, modification or postponement for reasons beyond their control or any other justified necessity.

As written in the general requirement section, it is recommended to use bright colored fabric for your CanSat. Additionally, the teams can consider making use of other systems, like acoustic or radio emitters on the CanSat, in order to facilitate the recovery missions after landing. Moreover, remote sensing instrumentation available at the launch site could support the CanSats' recovery missions. Depending on the wind conditions, CanSats should be expected to be found within a large area around the launch site: CanSat recovery is not guaranteed.

Primary mission: required data to send

The measurements taken during the flight must be stored in a file (*.CSV format). The participants will send the CSV file with the data to the organizers before “Day 3” as well as the graph(s) of flight data with a PNG image(s).

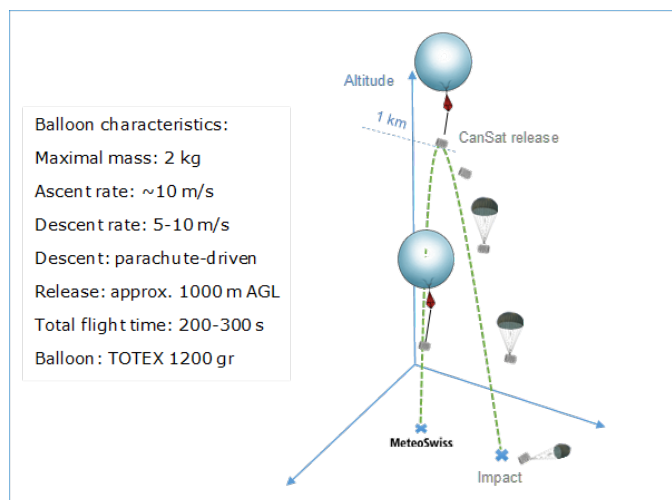
TECHNICAL REQUIREMENTS

The CanSat competition is designed to simulate all aspects of a real satellite mission including design, development, testing, launch, operations, and data analysis, by means of teamwork.

²: Please consider the following address: Office fédéral de météorologie et de climatologie MétéoSuisse, Chemin de l'Aérologie 1, CH-1530 Payerne

Balloon/drone specifications

MeteoSwiss will provide the launch platform for the competition. The CanSats will be launched either by aerostatic balloons or an unmanned drone, to an altitude ranging approximately from 400 m to 1000 m. The launch site is the aerological station of MeteoSwiss in Payerne (Switzerland). An automatic system will release the payload at the target altitude, which may vary according to the launcher and the weather conditions. Once the CanSats are released, after the deployment of its embedded parachute, the descent is smoothed until ground impact.



The CanSat is usually found within 1-3 km from the launch site as it is shown and described in the next paragraph. The best near-real-time impact forecast will be provided using the remote sensing instrumentation available at the MeteoSwiss Payerne site like wind lidar and wind profiler technologies. However, recovery of the CanSats cannot be guaranteed. An example of balloon drop-off from the altitude of 1 km AGL (above ground level) is given in the image below.

The criteria set for the wind force to decide whether a CanSat flight will be performed

or not, are defined on the basis of the closest-in-time wind profile by the wind profiler of Payerne and The COSMO model. In case these limits will be exceeded, the launch day will be postponed.

SwissCanSat requirements

To verify that the CanSats are suitable for launch, a technical inspection will take place at the beginning of each CanSat launch campaign. The evaluated requirements are:

- Air temperature and air pressure must be stored at least every second in an on-board removable memory card. This card must be easily accessible/removable to the launch operators.
- The CanSats must include a loud audible retrieval system (e.g. beeper) since data could be stored only on-board.
- The CanSat must include a visual indicator (e.g. LED) to show the power is switched ON. This will help the launch operators to check the CanSat is ready for launch.

General requirements

The CanSat hardware and mission must be designed following these requirements and constraints:

1. The components of the CanSat must fit inside a standard soft drinks can (115 mm height and 66 mm diameter), with the exception of the parachute. Radio antennas and GPS antennas can be mounted externally on the top or bottom of the can, depending on the design, but not on the sides.

2. Note: The payload area usually has 4.5 cm of space per CanSat available, along the can's axial dimension (i.e. height), which must accommodate all external elements, including parachute, parachute attachment hardware, and any antennas. The antennas, transducers and other elements of the CanSat cannot extend beyond the can's diameter until it has left the launch vehicle.
3. The weight of the CanSat must be between a 300 gr and 350 gr. CanSats that are lighter must take additional ballast with them to reach the 300 gr minimum mass limit required.
4. Explosives, detonators, pyrotechnics, and inflammable or dangerous materials are strictly forbidden. All materials used must be safe for the personnel, the equipment, and the environment. In case of doubt by organizer, Material Safety Data Sheets (MSDS) may be requested from the teams.
5. The CanSat must be powered by a battery and/or solar panels. It must be possible for the systems to remain switched on for four continuous hours.
6. The battery must be easily accessible in case it needs to be replaced/recharged.
7. The CanSat must have an easily accessible master power switch.
8. . Inclusion of a positioning system for retrieval (beeper, radio beacon, GPS, etc.) is recommended
9. The CanSat should have a recovery system, such as a parachute, capable of being reused after launch. It is recommended to use bright colored fabric, which will facilitate recovery of the CanSat after landing.
10. The parachute connection must be able to withstand up to 50 N of force. The strength of the parachute must be tested to ensure that the system will operate nominally.
11. For recovery reasons, a maximum flight time of 120 seconds is recommended. If attempting a directed landing, then a maximum of 170 seconds flight time is recommended.
12. A descent rate between 8 and 11 m/s is recommended for recovery reasons. However, the CanSat's descent speed must not be lower than 5 m/s or higher than 12m/s for safety reasons. Additionally, the airfield or weather conditions might determine additional mandatory restrictions on the velocity.
13. The CanSat must be able to withstand an acceleration of up to 20 g.
14. The total budget of the final CanSat model should not exceed 500CHF. Ground Stations (GS), ground support equipment, such as laptops, power supplies, antennas, and any related non-flying item will not be considered in the budget. If the CanSat kit has been provided to your school, a cost of 150 CHF has to be considered within the budget. More information regarding the penalties in case the teams exceed the stated budget can be found in the next section.
15. In the case of sponsorship, all sponsored items should be specified in the budget with the actual corresponding costs on the market.
16. Live radio frequency reception is possible but this has to be discussed with the national organizers who will decide whether the data should be stored in an on-board removable memory card and/or transmitted to ground. If radio communication is accepted by the organizers, the assigned frequency must be respected by all teams in the Launch Campaign. It is recommended that teams pay attention to the design of the CanSat in terms of hardware integration and interconnection, so that the radio frequency can be easily modified if required.
17. The CanSat must be flight-ready by the deadline specified by the organizer.

Meeting the general requirements for the Swiss Launch Campaign

To verify that the CanSats are suitable for launch, a technical inspection and a drop test will take place at the beginning of each Swiss CanSat launch campaign. The way the requirements are evaluated is as follows:



- Requirements 1, 2, 3, 7, 12 and 16 will be evaluated on site by a specially appointed CanSat technical team. Teams that don't pass any of the tests at the first attempt will only be permitted one second chance to amend the issues, in order to meet all the requirements. In case of failing at the second attempt, the team will be considered not to have achieved flight status and their CanSat won't be approved for launch.
- **Requirements 10 and 13** refer to tests that should be carried out prior to the SwissCanSat launch campaign and the proof of these tests being successful should be stated in the PDR.
- A statement of confirmation that the rest of the requirements are met should be included in the final design report, paying special attention to **requirement 14**, which must be stated in the document.

EVALUATION AND SCORING

The jury

The jury, appointed by HES-SO and MeteoSwiss, will be composed of CanSat experts, education experts, or engineers and scientists who will evaluate the teams' performances during "Launch your CanSat – SwissCanSat Launch Campaign and post-flight activities", taking into account the CanSat Pre-launch Reports. The jury members will score the teams during the launch campaign and announce the results from their scoring in the Closing Ceremony. The jury will have 4-6 members, and their fields of expertise can vary from science to engineering or education. The jury board is usually composed of:

- Space science/engineering expert(s)
- IT/Electronics expert(s)
- Education expert(s)

Scoring

The teams will be evaluated on an ongoing basis, with the following items being taken into account:

1. Technical achievement

The jury will take into account how the teams obtained the results, how reliable and robust the CanSat was, and how the CanSat performed. Innovative aspects of the project will be judged (e.g. the tools selected and the hardware/software used). The aspects evaluated will be:

- Mission's technical complexity: The CanSat's technical level, understanding of the technical concepts and the originality of the engineering aspects of the mission.
- Performance of the Primary mission: The CanSat's technical performance in terms of deployment and data collection for the Primary Mission.
- Performance of the Secondary mission: The CanSat's technical performance in terms of deployment and data collection for the Secondary Mission

2. Scientific value

The scientific value of the teams' missions and the teams' scientific skills will be evaluated. This includes the scientific relevance of the mission, the quality of the technical reporting (both written and oral) and the team's scientific understanding that will be assessed from the team's ability to analyze and interpret results appropriately. The aspects evaluated will be:

- Scientific relevance: Assessment of whether measurements are done with a clear and well-founded scientific purpose, the extent to which the CanSat is used in an original way and if the data collection is appropriate for reaching the objective.





- Scientific understanding: Level of understanding of the scientific principles that underlie the project.
- Technical reporting: Ability to summarize with clarity and provide a readable and complete Pre- Launch report, the proper labeling of the graphs and use of the correct units and the ability to present scientifically sound data and interpretations during the launch campaign.

3. Professional competencies

The Jury will assess the team’s collaboration and coordination, adaptability and communication skills. The aspects evaluated will be:

- Teamwork: Collaborative effort of the team in order to complete the tasks in the most effective and efficient way.
- Communication: Oral presentation skills, the ability to provide a captivating presentation involving confident speaking skills and a visually appealing presentation.

4. Outreach

The team will be awarded points on how the project is communicated to the school and the local community, taking into account web pages, blogs, presentations, promotional material, media coverage etc.

Marking scheme

Each member of the Jury will rank from 1 to 10 for each criterion, and the final score per criterion is the average of the individual marks awarded by the jury’s members.

The best overall score is calculated by weighting the individual marks per criterion with the weight indicated in the table below:

#	Best overall score	100%
1	Technical achievement	35%
2	Scientific value	35%
3	Professional competencies	20%
4	Outreach	10%

Penalties

Teams’ final scores will be penalized with 1% per day of late submission of the CanSat Pre-Launch Report. Similarly, 1% of the final score will be subtracted per 10 CHF extra spent over the maximum CanSat budget of 500 CHF.

Prizes

The award scheme is designed to acknowledge teams’ strengths in as fair a way as possible. At the SwissCanSat competition, the prizes will be awarded according to the following categories:

- **Best SwissCanSat Project**: this prize will be awarded to the team with the best overall score. The overall winning team will then be invited to take part in ESA’s European CanSat competition alongside the overall winners from other ESA member states taking part in the competition. More information about the European competition and the guidelines for taking part can be found [here](#).
- **Highest Technical Achievement**: this prize will be awarded to the team with the best score in the “Technical Achievement” field.
- **Outstanding Science Mission**: this prize will be awarded to the team with the best score in the “Scientific value” field.



- **Most Professional Team:** this prize will be awarded to the team with the best score in the “Professional competencies” field.
- **Best Outreach prize:** this prize will be awarded to the team with the best score in the “Outreach” field.
- **The Most Promising Junior Team:** among the teams which participated to the SwissCanSat competition and with a successful primary mission, this prize will be awarded to the team with younger students.
- **The Most Promising “Ingenieuse” Team:** Ingenieuse.ch is an initiative of the Engineering faculty of the HES-SO aiming at changing the traditional perception of women who choose jobs that are still considered "atypical" in Switzerland today. The prize will be awarded to the team with the best gender balance in term of technical and personal contributions.

The following rules will also apply:

- A team cannot receive more than one prize.
- The *Best SwissCanSat Project* prize will be awarded to the team with the highest overall score.
- If a team is ranked the highest in several categories, priority will be given to the highest weighting prizes (Outstanding Science Mission (35%) or Highest Technical Achievement (35%)); in case a team is ranked the highest both in the Scientific value and Technical Achievement fields, the prize awarded will be for the category in which the team has the highest score margin, ahead of the 2nd ranked team in that field.

For example, if one team has the best scores in both Technical Achievement (scoring 8.5 out of 10) and Outreach (scoring 9.5), they will then be granted the Highest Technical Achievement prize because this category has a higher weighting, and the Best Outreach prize will be granted to the second-best score in that field.

In a different scenario, where a team has both the best overall score (scoring 8.5) and the best score in Outreach (scoring 9.5), this team will be awarded the SwissCanSat prize instead, as this prize needs to be awarded to the best overall score, and the 2nd ranked team in the ‘Outreach’ field would receive the respective prize.

MATERIAL AND INTELLECTUAL PROPERTY

The teams will be responsible of the communication material used: videos, images, photos, texts, etc. must be used in agreement with the natural or legal persons who have contributed to their production. Teams must ensure that the texts, visuals and sounds used in their images or in their videos are free of all intellectual or other property rights that third parties may hold or that, failing that, their use has been authorized by the rights holders or by law.

Teams guarantee that they are indeed the authors of the creations that they present within the framework of the competition. If failing to do so, plagiarism or forgery could be reproached to the team concerned which shall be excluded from the competition.

Responsibility

SwissCanSat organizers cannot be held responsible for any failure or abuse of third parties’ material, misbehavior of any kind of harm or prejudice to involved people, nor any negative consequences of their activity.

Teams must behave professionally and be respectful. In particular, harassment of any kind, sexist, racist, or exclusionary comments or jokes and offensive comments or jokes related to individual characteristics, for example: age, sexual orientation, disability, physical appearance or religion, are prohibited.

Personal data

By applying and submitting the teams' application, a set of personal data is required from each participant. Their personal data shall be processed only for the purposes of the SwissCanSat organization, and shall not be used for any other purpose. In particular, SwissCanSat organizers do not sell or make available in other ways personal data for commercial purposes. This data shall be kept as long as it is necessary for the competition organization and shall be deleted after. Participants under age of 18 will require a signed agreement of their parents.

Claims

Any legal remedy regarding the SwissCanSat competition is excluded.

Acceptance of the guidelines

By applying and participating to the SwissCanSat, the participants accept these guidelines. The SwissCanSat organizers may therefore exclude any participant/team from the competition if a participant or team do not respect these guidelines. The exclusion from the competition can be done at any time and without notice.

FINANCE

This section outlines the expectations as to ownership of costs for the competition. This is for guidance only and does not constitute an agreement between HES-SO and any third party. HES-SO will pay for:

- Catering for the day 2 and day 3 during the launch campaign (for scenario "The SwissCanSat launch campaign is run on-situ")

The school or sponsors will pay for:

- Transport to and from each event outlined above.
- Any additional electronic equipment required for the secondary mission or ground support.
- Costs associated with more than one teacher and six students from each team attending an event.
- Any costs of cover for teaching.
- Any other costs incurred by the team not specified above.

FURTHER REFERENCE

Participants can find further information from the following links:

- CanSats in Europe Portal <http://www.esa.int/Education/CanSat>
- CanSat in Europe Facebook page www.facebook.com/cansatsineurope/





ANNEXES

ANNEX 1 – REPORTING FOR PDR, CDR AND FDR

Instructions: *this is a template for the CanSat reports – please copy and paste the below template into a separate document and follow it as it is. Maximum page limit for the report is 30 pages, plus unlimited appendices. You should consider your technical solution, your outreach and teamwork and lessons learnt from the process.*

The reports written in English must be submitted in PDF, in Verdana font, size 11.

For the final report: *For the final version of this report, we have included sections on the launch day and lessons learned to be included.*

SwissCanSat Report

Team Name

School

Preliminary Design Review (PDR)

Critical Design Review (CDR)

Final Design Review (FDR)

(delete as applicable)

Date: DD/MM/YYYY

Introduction

1.1 Team Organization and Roles

(This part should contain a simple list of people involved, their skills and expected roles)

1.2 Mission Overview

1.2.1 Mission Objectives

(This part is not a description of the CanSat, it is only a summary of the main goals that you CanSat will achieve, and a sentence on what these goals achieve with relation to scientific/engineering objectives)

Primary Mission:

(This part should contain a list of primary objectives of your mission – such as given in CanSat requirements)

Secondary Mission:

(This part should contain a concise list/description of the secondary mission you are planning to achieve)

1.2.2 What will you measure, why and how?

(Concise description of what measurements your CanSat will make, why will you take these measurements and what sensing capabilities will be required. Include some thought on how will you analyze the data)

2 CANSAT DESCRIPTION

2.1 Overview

(A summary on the configuration of your CanSat – detailed information is included in the sections below. A high-level description of CanSat and how the implementation will be performed).

2.2 Mechanical design

(This part should involve a high-level design description of mechanical parts and must include easy to understand sketch of the CanSat, its components and ideas of suitable materials (and their justification))

2.3 Electrical design



(High-level description of initial electrical design. Must have a block diagram of the electronic system, devices and how they are interconnected as well as ideas for these devices (and their justification))

2.4 Software design

(High-level description and initial block diagrams or flow diagrams of the operation of software)

2.5 Landing and recovery system

(Ideas and justification for landing and recovery system/parachute. This section should be more in-depth if the mission includes some special landing gear or separating parts)

2.6 Ground support equipment

(High-level description of ground equipment and block diagrams of mechanics, electronics and operation. This includes your laptops, Yagi antennas, or any other equipment that you need on the ground to support the launch.)

3 PROJECT PLANNING

3.1 Time schedule

(A detailed project time plan which shows the tasks required to complete the project and the time (suggested to be hours required) allocated to each step. This should cover all scientific, technical and outreach tasks that need to be done and is updated with each report. A Gantt chart may be used to display this project planning.)

(This must be at least a high-level weekly plan)

3.2 Team and External Support

(Your team is your most vital resource. You must be aware of your competencies and be able to identify where you may need to expand the team or ask for external support. Please describe the tools and support available to you and what external support you are planning to get. Please identify, based on your team skills, what support you may need.)

3.3 Risk Analysis

(What could go wrong for the project? Think about the team, time constraints, equipment or technical issues. This will change as the project develops.)

3.4 Test Plan

(A brief summary of ideas for testing. The test plan should detail how you are going to test your equipment to show the CanSat will meet your objectives given in Part 1. How can you best simulate the conditions for your launch?)

4 OUTREACH PROGRAMME

(Consider all types of media to promote and disseminate information about your project. Write a general summary of media and schools that are planned to be reached)

5. LAUNCH DAY PREPARATION

5.1 Launch checklist/countdown

(a ordered list of tasks with times, durations and team members responsible that you shall follow on the launch day to setup your CanSat and ground support equipment ready for launch)

5.2 Post mission checklist

(a ordered list of tasks with times, durations and team members responsible that you shall follow once your can is back on the ground. Might be as simple as "1. save data 2. turn can off")

5.3 Results analysis procedure

(description of procedure of how you are to interpret and use your sensor data for use in your presentation. Include details of any calculations used and how this analysis relates to your primary/secondary mission objectives. How will you determine if your measured data is valid and what is your criteria for a successful mission?)

(description of procedure of how you are to interpret and use your sensor data for use in your presentation. Include details of any calculations used and how this analysis relates to your primary/secondary mission objectives. How will you determine if your measured data is valid and what is your criteria for a successful mission?)

5.4 Results and data analysis*

(A summary of the collected flight data by means of tables and graphs relates to your primary/secondary mission objectives. Include also a data analysis with your interpretations of the results.)



6 LESSONS LEARNED*

(Reflect on the last 6 months. What have you learnt from the process? Has this changed anything for you in terms of subject or career decisions? What has been the most challenging part? What has been the best part?)

*Only required for final report





ANNEX 2 – PARENTAL PERMISSION AND LIABILITY WAIVER SWISSCANSAT – OCTOBER 2022 TO MAY 2023

I the undersigned (surname and first name of the parent or legal representative) : _____

Home address (full address) : _____

Daytime phone number : _____

Legal representative of the minor child (Surname and first name of the child) : _____

Child's date of birth : _____

Home address (full address) : _____

- I hereby authorize my child to participate in the SwissCanSat competition (October 2022 to May 2023).
- I accept that I will not hold the HES-SO and its Schools, the organisers of the SwissCanSat competition, responsible for any injury or material damage caused or suffered by my child, for any loss or theft of equipment or personal belongings during the activities related to the competition. It is the responsibility of the legal representative, if he or she deems it necessary, to take out insurance.
- I waive all rights to the work in which my child has participated, and which remains the property of the HES-SO or its Schools.
- I expressly give my consent for my child to be photographed and filmed in the context of the SwissCanSat competition and that these images may be published on the websites and the social networks of the HES-SO and its schools as well as on flyers related to the outreach activities foreseen in the competition. The HES-SO and its Schools undertake to sort the images submitted for publication, in order to ensure the respect of the participants. I can ask at any time the removal of an image if its publication doesn't suit me.
- I acknowledge that this duly completed authorization and liability waiver is required for my child to participate in the SwissCanSat competition.

Place

Date

Signature (preceded by the words "Read and approved") _____

