



The Canadian CanSat Design Challenge 2026-27 Rules & Requirements ADVANCED Category



Prepared by the Canadian Satellite Design Challenge Management Society, with generous support from:

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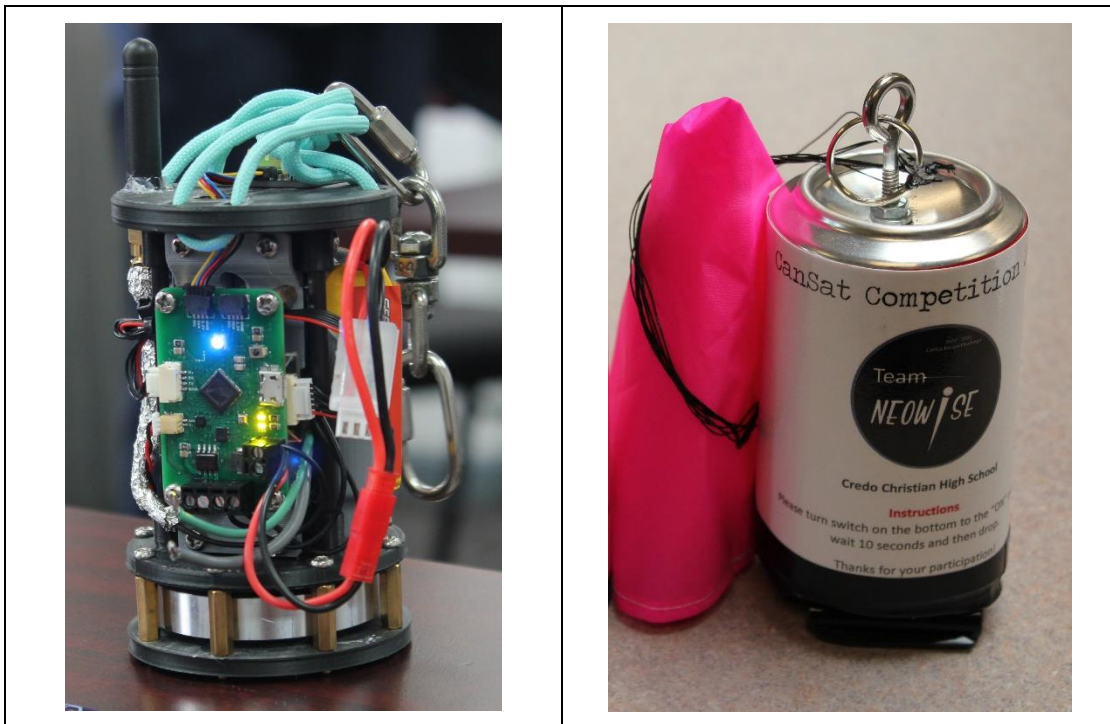
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INTRODUCTION

The Canadian CanSat Design Challenge is an educational initiative which requires teams of secondary-school students to design, build, and launch their own miniature satellite called a “CanSat”. A CanSat is a simulation of a real satellite, which is the size of a standard pop can, and weighs between 300 and 350g.

The CanSat contains a small computer, a sensor to record air temperature and pressure, and an additional experiment of the team’s choosing. The CanSat must transmit the air temperature and pressure data by radio to a receiver on the ground (but it may also save the data on-board on a memory card).



A CanSat is a pop-can-sized “satellite.”

For the **ADVANCED** Category, your CanSat will be carried up by a rocket to an altitude of approximately 1,000m, then will be ejected from the rocket to parachute down to the ground. All this time it will collect and transmit the experiment data by radio, which you will later analyse.

Participation Categories

Two categories of the competition are offered: **Beginner** and **Advanced**.

Which category is right for your team? The following diagram illustrates the main differences between them, to help you choose the right one for you.

Category Details	Beginner	Advanced
Team Size	Two to four people, in any grade.	Four to six people, in any grade.
CanSat Requirements	- Record air temperature and pressure once per second. - Add a second experiment of your choice (but we'll provide one if you want to use it). - Save the data on-board on a memory card.	- Record air temperature and pressure once per second. - Add a second experiment of your choice. Advanced teams are encouraged to add an interesting or challenging science or engineering experiment. - The CanSat transmits the data via radio, and you receive it on the ground.
How much will it cost?	Almost nothing! We will provide you with a kit with almost all of the components, and video tutorials to guide you. You just need to find a can and a few tools! The only other cost is to mail your CanSat to us, so that we can drop it from a drone for you.	- Your CanSat must cost less than \$500. - You need to raise enough money to attend the launch event in Alberta. This includes paying for travel to Calgary, four nights in a hotel, and some meals.
Is it suitable for me?	If you have little to no experience with electronics or programming.	If you have some experience with electronics and programming, and want a bigger challenge.
Reports to write?	No!	Yes! A Design Report is required.
Presentations to give?	At least one presentation to younger students, or an outside group. And then a final presentation of your results at an online meeting.	At least three presentations, to younger students and the public. Offering to give a presentation to a potential sponsor is a great way to help raise funding to attend the launch campaign.
How is it launched?	We'll drop it from a drone, up at least 120m.	From a rocket, 1km in altitude or higher, at the launch event in Lethbridge, Alberta.
When does it start?	Registration opens around the middle of September, and closes November 1. We will send you the CanSat kit by the middle of December. You start building it in January, and mail the completed CanSat to us in mid-May.	Registration opens around the middle of September, and closes November 1. You can request a CanSat kit, or start building your CanSat with your chosen components.

CanSat Video Tutorials

The CSDCMS has created a number of publicly-accessible video tutorials on YouTube, located at:

<https://www.youtube.com/@CSDCMS>

These tutorials guide you through the process of assembling and testing a Beginner category CanSat, from when you receive your CanSat kit, to the final finished product.



COMPETITION SCHEDULE

These are subject to some changes, but hopefully not many!

Beginner Category	
Registration Deadline	November 1, 2026
CanSat kits sent to teams	By December 15, 2026
Design! Build! Test!	January to April, 2027
Launch Event in Lethbridge	TBD - Late April

Monthly Presentations and Q&A (Online)

There will be a monthly online meeting (e.g., by Zoom or Teams) in which we will give a short presentation about space industry and space mission topics. There will also be time for teams to ask questions about the presentation or their CanSat (e.g., if they are having technical issues). This will be scheduled for the **second Saturday of each month, starting in January**. The sessions will begin at 8:30 a.m. Pacific Time.

Note: Starting in Autumn of 2026, British Columbia will remain on Pacific Daylight Time, and will not “fall back” to Standard Time. However, most of the rest of the country will “fall back”. That would mean that in January and February, and possibly also March, the sessions will begin at 10:30 a.m. Eastern Time, but for April and May it will likely be 11:30 a.m. Eastern. Are you confused yet?

So, the dates will be:

Saturday, January 9, 2027
Saturday, February 13, 2027
Saturday, March 13, 2027
Saturday, April 10, 2027
Saturday, May 8, 2027



General Rules

Student & Team Eligibility Requirements

Teams in the **Advanced** category must have at least four, and no more than six, members.

All team members must be legally considered of "school age" in the province or territory where they reside. There is no specific minimum age or school grade for team members, but the competition is currently intended for students who have completed elementary school. In some provinces, secondary school or middle school starts at Grade 9; in others, it is Grade 8. Past competitions have even had participation from one or two students in Grade 6, though.

The team members may be from different schools, or from a non-school group (e.g., a STEM club, Scouts, Girl Guides, etc.).

Maximum Number of Teams Permitted at the Launch Campaign

Due to the time and logistics of launching and retrieving the CanSats, there may need to be a maximum number of teams permitted to attend the launch campaign. Past experience suggests that 20 is a reasonable maximum of CanSats which could be accommodated in a one-day launch campaign.

Although this has never occurred (to date, 14 is the maximum number of teams which has attended a single launch campaign), in the event that the maximum number of teams is exceeded, the CSDCMS may need to down-select the teams which may attend. The priorities which would be applied to down-select the teams would be to ensure that every school/group can be represented by at least one team. Schools/groups with multiple teams wishing to attend may be requested to reduce their number, with preference going to teams of older students (since younger students can attend in subsequent years).

Team Supervisor

Each team must have a supervisor, i.e., a teacher or other mentor, who will be responsible for monitoring the team's technical progress, offering help and advice, and acting as the team's point of contact with the CSDC Management.

There Is No Registration Fee!

There is no cost to enter! Really! But, each team is responsible for many of the costs of attending the launch campaign in Lethbridge, Alberta. See the "Expenses to be Covered by Teams" section later in the document.

How to Register

Please complete the Registration form on our website (www.csdcms.ca).



How to Contact Us

The point-of-contact for the CanSat Design Challenge is:

Lawrence Reeves

e: LReeves@csdcms.ca

m: +1 778-988-6343

Email contact is preferred.

Language of Communication

Communications with the CanSat Management may be in either English or French.



MISSION & TECHNICAL REQUIREMENTS

The following terminology is used for the requirements:

- “**must**” denotes a requirement which is **mandatory**;
- “**should**” denotes a requirement which is **optional, but recommended**;
- “**may**” denotes a requirement which is **optional**.

Primary & Secondary Missions

1. **Primary Mission:** When turned ON, your CanSat **must** measure and record the air pressure and air temperature once every second.
2. **Secondary Mission:** Each team must implement a secondary experiment of their own choosing, which fits within the CanSat.

Note: CanSat kits will contain a potential secondary mission, but teams are welcome to select an alternate experiment. Teams can take ideas from real satellite missions, 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.

Dimensions and Mass

3. All the components of the CanSat must fit inside a standard soft drink can (115 mm height and 66 mm diameter). An additional 100 mm at the “top” end, above and external to the can, is available for the parachute, parachute connection(s), and any radio antennas (e.g., GPS). Elements of the CanSat must not extend beyond the allowable 66mm diameter until the CanSat has left the rocket (or drone) tube.
4. The launched mass of the CanSat (i.e., including the parachute) **must** be between a minimum of 300 grams and a maximum of 350 grams. CanSats that are lighter **must** take additional ballast with them to reach the 300 grams minimum mass limit required.

Power

5. It **must** be possible for the CanSat to remain powered on for at least 60 minutes, and to be able to collect, transmit, and record (if implemented) data during that time.
6. The battery **should** be easily accessible in case it has to be replaced/recharged.
7. The CanSat **must** have an easily-accessible master power switch.
8. The CanSat **must** have an “ON” light which **must** be obvious to notice when the CanSat is powered on.



Data Downlink and Collection

9. The CanSat **must** downlink the Primary Mission data by radio. This data **must** be received and recorded by the team on the ground. Each team will be assigned a downlink centre frequency. This assigned frequency **must** be respected by all teams in the Launch Campaign.

Note: The allowable frequency in Canada is the 915 MHz range (902 MHz to 928 Mhz). The Reyax RYLR896 is a suggested model which meets this requirement.

10. The CanSat **may** save all of its experiment data on memory integrated inside the CanSat.
11. The CanSat **may** downlink the Secondary Mission data on the same assigned frequency, or another legal frequency of their choice outside of the 902 MHz to 928 MHz range.

Parachute and Safety Considerations

12. Advanced teams may incorporate a controllable descent and/or landing system (e.g., drone motors or a steerable parafoil), instead of, or in conjunction with, a parachute.
13. If a parachute-only configuration is used, the descent rate must be between 5 and 12 m/s, and should be between 8 and 11 m/s. It is highly recommended to use brightly-coloured fabric (e.g., “high-visibility orange”) for the parachute, to facilitate recovery of the CanSat.

Note: The descent speed is an important safety requirement, to ensure that your CanSat doesn't descend too quickly (impact danger) or slowly (drift away in a breeze).

14. If a parachute is used, the parachute connection must be able to withstand up to 15 Newtons of force (equivalent to ~1.5 kg of weight). The strength of the parachute must be tested to ensure that the system will operate nominally.

Note: In past Advanced Category launches, 3D-printed top panels which have a single eye-bolt for parachute attachment have sometimes broken, resulting in the loss of the CanSat. It is recommended that you use either multiple attachment points for parachute strings, or something stronger than a 3D-printed panel.

15. In order to survive the launch, the CanSat must be able to withstand an acceleration of up to 20g.
16. The CanSat must not have any explosives, detonators, pyrotechnics, un-contained spring-loaded components, or flammable or dangerous items.

Note: Management reserves the right to exclude any CanSat which it considers to be in any way hazardous.

17. The total budget of the final CanSat model **must** not exceed CAD \$500 (including the cost of the CanSat kit). Ground Stations and any other non-flying items will not be considered in this maximum budget.



Educational Outreach Presentations

18. Each team must give at least one presentation to each of the following groups:

- an elementary school class or group;
- a junior secondary school audience (Grades 8 to 10); and,
- a public audience, such as a school “Open House”, a teachers’ conference, or other adult-level audience.

Note: Only three presentations are required, but you are welcome and encouraged to give more! There is a trophy for best Educational Outreach.

Post-Flight Analysis

Following the launches, teams will prepare a short presentation of the results of their experiments to present at the Finale. For example, the Primary Mission results can be displayed in a graph which shows the air pressure and temperature during the mission, and the calculated altitude of the CanSat during the mission.



The Launch Campaign

For the **Advanced** category, teams attend the **Advanced Category Launch Campaign**, which will be held in **Lethbridge, Alberta**, in late April, 2026 (exact dates To Be Determined, but it will begin on a Thursday, and you return the following Monday).

The CSDCMS will provide bus transportation from Calgary airport, but teams are welcome to travel to Lethbridge on their own.

will be required to raise the necessary funding for travel to Calgary International Airport, five nights' accommodation in hotel, and meals (the hotels we have stayed at have had complimentary breakfast. The CSDCMS also provides lunch on the launch day, and the opening and finale dinners).

Launch Campaign Preliminary Schedule

The following is the preliminary schedule for the launch campaign (all times are given in Mountain Standard Time):

Day	Time	Event
Thursday	14:00	Meet at Calgary airport to board the bus. Arrival in Lethbridge or Drumheller at ~17:00.
	19:00	Opening Ceremony and Dinner. CanSats inspected.
Friday	09:00	Team presentations. Each team is given a 20-minute time slot in which to present their CanSat and mission to the Jury. CanSats will be weighed and measured.
	17:00	All CanSats must be handed over to the competition manager (no more modifications!).
	21:00	Possible evening activity (visit to Lethbridge Observatory).
Saturday	08:00	Teams board the bus to travel to the launch site. The teams will be on-site until approximately 17:00. CSDCMS will provide water, snacks, and lunches. There will be toilets on-site.
	21:00	Back-up day to visit the Lethbridge Observatory.
Sunday	08:00	Back-up day for launching.
	17:00	Presentation of results by the teams. Finale Dinner & Awards.
Monday	08:00	Board the bus for travel back to Calgary airport. The bus is expected to arrive at the airport by 11:00. Please book return flights for no earlier than 14:00.

Preliminary Schedule for the 2026-27 Advanced Category Launch Campaign.



Technical & Safety Verification

A statement of confirmation that the each of the requirements has been met must be included in the Pre-Launch Report.

The CanSat will be evaluated on site following the Opening Dinner. Teams that don't meet one or more of the requirements will be permitted time to remedy the issues. If the non-compliance has not been corrected by the hand-over time Friday evening, scoring penalties may apply.

Launch Profile

The launch may be conducted by amateur high-power rockets, or the CanSats might be dropped from a drone. Note that the physical conditions experienced by the CanSat will differ depending on the launch method.

- If a rocket launch is used, the CanSat will be turned ON, then integrated into the rocket in a horizontal orientation. The rocket is carried to the launch pad vertically, put onto the launch rail in a horizontal orientation, then brought to a vertical orientation for launch. The launch will consist of a short duration of very high acceleration (up to 20g), followed by a coast phase of near free-fall conditions ("zero-gravity"), then the CanSat is ejected near apogee.
- If a drone deployment is used, the CanSat will be turned on, then placed in the CanSat deployer in a vertical orientation. It will then be carried aloft in a vertical orientation until it is dropped. It will not experience any high acceleration like a rocket launch would.

In either launch scenario, it is unlikely that you will be able to establish a radio connection (either receiving or transmitting data) with the CanSat until after it has been deployed from the rocket or drone.

Expenses to be Covered by the CSDCMS

The CSDCMS will be responsible for the costs of providing the following:

- Coach transportation from Calgary airport to Lethbridge, and return.
- Opening Ceremony dinner on Thursday.
- Lunches, beverages, and snacks at the launch site on Saturday.
- Finale dinner on Sunday.

Expenses to be Covered by Teams

Teams will be responsible for the following costs:

- Travel costs to Calgary airport (teams may opt to drive to Lethbridge on their own).
- Hotel costs.
- Any meals not provided by the CSDCMS.
- Any other individual costs incurred during the campaign.



Evaluation & Scoring

As of September, 2024, the European Space Agency is planning their “Engineer for a Day” conference, to which national representatives from all ESA member states (including Canada) are invited. The workshop takes place at the ESA ESTEC

The Jury

The Jury will be comprised of CanSat experts, education experts, or engineers and scientists who will evaluate the teams’ performances during the **Launch Campaign**, considering the CanSat Pre-Launch Report. The jury members will score the teams during the launch campaign and announce the results from their scoring in the Closing Ceremony.

Evaluation Criteria

Performance in the following areas will be evaluated:

A. Technical Achievement

The Jury will consider 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.

B. 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 analyse and interpret results appropriately.

The aspects evaluated will be:

- Scientific interest: Whether the scientific objectives are of value to the scientific community.
- Scientific adequacy: Whether measurements are done with a clear and well- founded scientific purpose, and if the data collection is appropriate for reaching the objective.



- Scientific understanding: Level of understanding of the scientific principles that underlie the project.

C. 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.
- Adaptability: Attitude towards continual improvement and ability to adapt to new conditions.
- Communication: Oral presentation skills, the ability to provide a captivating presentation involving confident speaking skills and a visually appealing presentation.
- Technical reporting: Ability to summarise with clarity and provide a readable and complete Pre-Launch Report, the proper labelling of the graphs and use of the correct units and the ability to present scientifically sound data and interpretations.

D. Educational Outreach

The team will be evaluated on how the project is communicated to the school and the local community, considering web pages, social media, presentations, promotional material, media coverage, etc. The outreach effort should include, as much as practical, presentation of the design and development process.

Scoring

The overall balance between the items to be evaluated is as follows:

Technical achievement	35%
Scientific value	30%
Professional competencies	25%
Educational Outreach	10%
TOTAL	100%

Penalties

Teams' final scores will be penalised with 1% per day of late submission of the CanSat Pre-Launch Report. Similarly, 1% of the final score will be subtracted per \$20 extra spent over the maximum CanSat budget of \$500.



Trophies

The following trophies are available to be awarded at the Finale:

- Champions' trophy
- Technical Achievement trophy
- Best Science Mission trophy
- Educational Outreach trophy
- Perseverance trophy
- Sportsmanship trophy

ESA “Engineering for a Day” Conference

In June, 2027, the European Space Agency (ESA) will host their “Engineer for a Day” conference, to which the national CanSat champion teams from all ESA member teams are invited. Canada is an Associate Member of ESA, and is eligible to participate in this conference.

Details can be found at the ESA CanSat website: <https://www.esa.int/Education/CanSat>

In the past, ESA has provided a travel stipend of €300, as well as accommodation and meals for up to six team members plus one adult supervisor. Additional costs are the responsibility of the teams.

The recipient of the Champions' trophy has the first right of acceptance to attend this conference. If they are not able to attend, the judging panel will select an alternate representative.

