



DJS Arya, official canister satellite team of D. J. Sanghvi college of Engineering (DJSCE), Mumbai.

It was formed in the academic year 2017-18.

DJS Arya represents DJSCE at the International CanSat competition organised by the American Astronautical Society (AAS) and American Institute of Aeronautics and Astronautics (AIAA).

On our first attempt we stood 96th among 300+ teams in CanSat 2018 and stood 34th in overall competition and 24th in PDR review in CanSat 2019.

We stood 13th all over the world out of more than 400+ teams participating in the PDR round of the CanSat 2020, leaving behind our last year's score and improving our rank considerably. We secured 2nd rank all over the world, and the 1st rank in India, in the CDR round. We bagged 9th position overall which was a huge jump from our previous year's ranking.

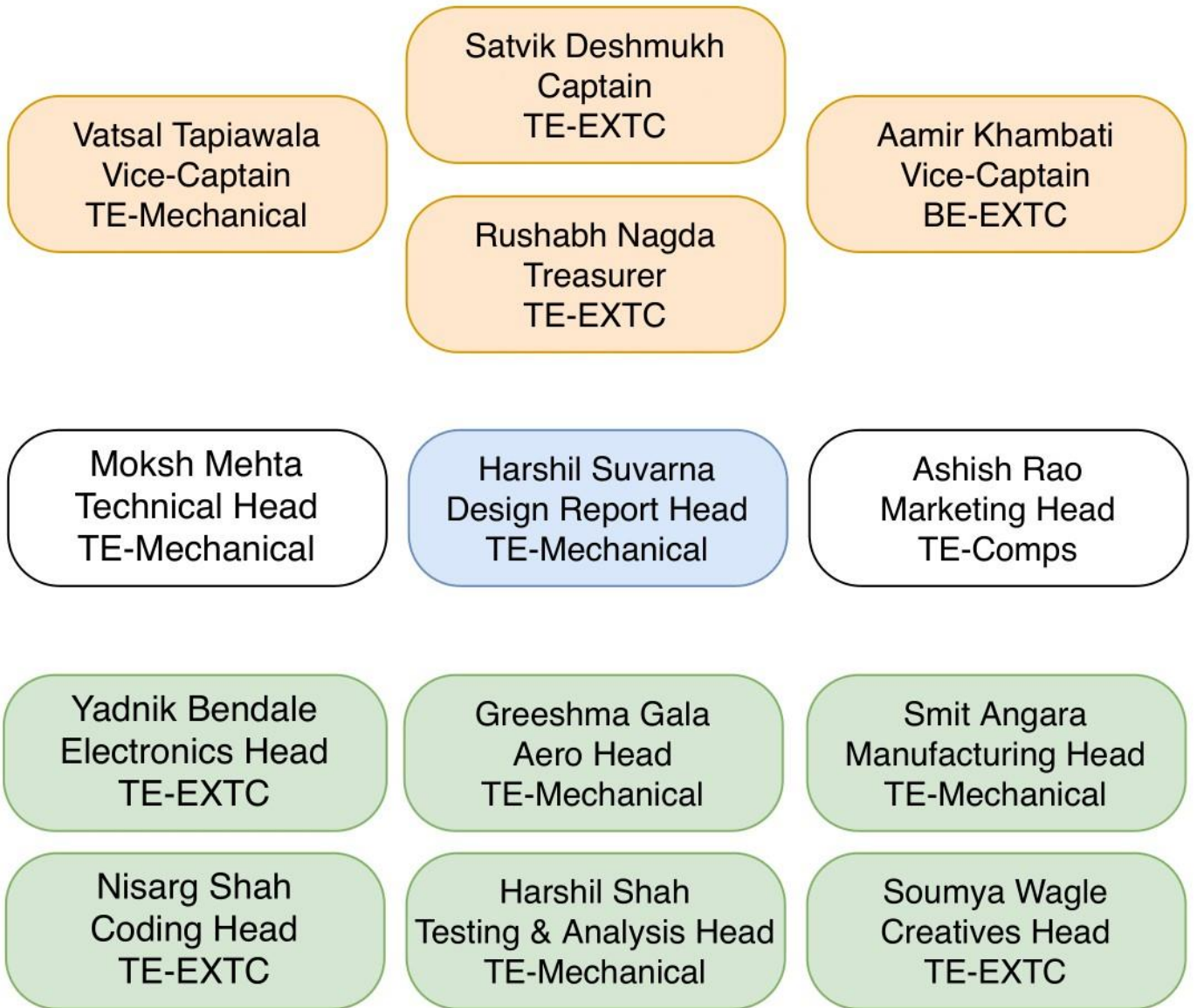
CanSat is a global level competition where colleges from all around the world participate.

This competition encourages young talent to come up with ideas about building Canister Satellite.

The contest is organised in affiliation with U. S. Naval Research Laboratory, NASA, Siemens, etc.

Launch location is Blacksburg, VA
Virginia Tech University.

Competition dates: June 10-13, 2021



PROBLEM STATEMENT:

Mission:

Autorotating Science Payload Relay Mission

Competition Description

The competition will proceed during the global pandemic. The competition is planning to have a launch in June for teams to demonstrate their payloads. The competition is also working on alternative plans in the event travel is not allowed or the host site has to cancel the launch. If the launch is not held, remote live demonstrations of the CanSat functionality will be performed in place of the launch. Other scored documentation will also be required. To control the size of the competition, only three teams per school are allowed to apply to the competition. It is recommended that schools hold internal design competitions to determine the three teams to apply. If more than three teams from one school apply, the first three applications received will be accepted. The competition is in five phases. Phase one is the application phase. Teams must submit an application and a \$200 competition fee that is non-refundable. The fee is used to offset the cost of rocket motors and other materials. Applications must be submitted by October 30, 2020. Payments will be requested in early November and must be paid by the given due date. Phase two is the preliminary design. Teams are to develop designs, prototype, test concepts and generate a preliminary design review (PDR) slide package using the provided template. Teams will submit PDR slides only in PDF format at the designated due date.

Teams that do not meet the due date or do not submit in the proper PDF format will be dropped from the competition. A schedule will be made available on when to present a subset of the slides. Teams will have a half hour to discuss a subset of the PDR slides via telecon. After PDR, a total of 48 teams will be invited to the competition. Phase three is the critical design. Teams will finalize their design and start ordering components, manufacturing parts, test subsystems and start developing the flight unit. Teams will generate a critical design review (CDR) slide package using the provided template. Teams will submit CDR slides only in PDF format at the designated due date. Teams that do not meet the due date or do not submit in the proper PDF format will be dropped from the competition. A schedule will be made available on when to present a subset of the slides. Teams will have a half hour to discuss a subset of the CDR slides via telecon. Phase four is the launch weekend. Friday, teams will be scheduled to present their completed CanSat for flight readiness review which must be completed in 30 minutes. The CanSat must be ready to launch at this time. It must be completely assembled and operational. Each team will be scored during the flight readiness review. Teams can only present once at the flight readiness review at their designated time. Teams late for the review will lose points. CanSat must pass the drop test, fit check, and battery verification in order to fly. Multiple attempts at the drop test are allowed. Saturday is the launch day where teams will perform final preparations and turn in CanSat by 12:00 hours local time. Launch will start at 13:00 hours local time and continue until all launches are completed. There will be no second flights unless the fault is of the launch provider and there are spare rockets and rocket motors. Phase five is the Post Flight Review (PFR). Post Flight Review is a 15-minute presentation of the flight results and 5 minutes for questions. Awards will be presented at the end of the post Flight Reviews. For teams to receive certificates of accomplishment and be considered for awards, they must complete all phases of the competition.

Mission Overview

Design a Cansat that shall consist of a container and two autorotating maple seed science payloads. The container shall contain electronics to release the autorotating maple seed science payloads and relay data from the payload to a ground station. The Cansat shall be launched to an altitude ranging 670 meters to 725 meters above the launch site and deployed near apogee (peak altitude). Orientation of deployment is not controlled and is most definitely violent. The CanSat container must protect the science payloads from damage during the launch and deployment. Once the CanSat is deployed from the rocket, the CanSat shall descend using a parachute at a descent rate of 15 m/s. At 500 meters, the container shall release one autorotating maple seed science payload. At 400 meters, the container shall release the second autorotating maple seed science payload. The container shall relay all telemetry sent from the science payloads until the container lands. The container shall also incorporate its own telemetry along with the autorotating maple seed science payload telemetry. The container shall transmit using the team number as its net ID. The autorotating maple seed science payloads shall descend after being released and spin rapidly enough so its descent rate is less than 20 m/s. The science payload shall transmit telemetry once a second and include air pressure and air temperature. The science payloads shall transmit for five minutes after being released and use the team number plus 5 as its net ID.

Preliminary Design Review

The PDR is a “multi-disciplinary technical review to ensure that the system under review can proceed into detailed design, and can meet the stated performance requirements within cost (program budget), schedule (program schedule), risk, and other system constraints”. The CanSat PDR shall demonstrate:

- An understanding of the CanSat mission requirements
- Allocation and derivation of system and subsystem requirements
- Definition of the CanSat concept of operations
- Overview of preliminary design that meets specified requirements
- Results of, or identification of, necessary trades to support preliminary design. While it is ideal to have completed trades prior to the preliminary design, it is not necessary.
- Results of, or identification of, necessary prototyping or testing efforts necessary to support or finalize the preliminary design.

- Preliminary budget
- Detailed development schedule

Preliminary design reviews shall be conducted via teleconference coordinated by the team lead(s). The PDR presentations shall be less than 30 minutes in duration including time for questions. Presentation reviewers shall be permitted to ask questions during the presentation (i.e., questions are not held until the end of the presentation).

The PDR shall follow the presentation template posted on the CanSat Competition website.

Critical Design Review

The CDR is “a multi-disciplined technical review to ensure that the system under review can proceed into system fabrication, demonstration, and test; and can meet the stated performance requirements within cost (program budget), schedule (program schedule), risk, and other system constraints”. The CDR shall demonstrate:

- All PDR level requirement TBDs and TBRs shall be resolved
- Refinement of the CanSat CONOP
- Results of detailed design and analysis for each subsystem
- Verification that detailed design meets system and subsystem level requirements
- Identification of subsystem and system level tests necessary for requirements

verification

- Results of requirements verification tests completed to date
- Overview of mission operations
- Preliminary launch day sequence of events
- Revised budget
- Updated development schedule

Critical design reviews shall be conducted via teleconference coordinated by the team lead(s). The CDR presentations shall be less than 30 minutes in duration including time for questions. Presentation reviewers shall be permitted to ask questions during the presentation (i.e., questions are not held until the end of the presentation). The CDR shall follow the presentation template specified in the “CanSat CDR Outline” document available on the CanSat Competition website. Extra material in the form of backup slides is permitted. Each section of the CDR shall be scored in accordance with the values listed in the outline. The CDR shall contribute to the total evaluation of the CanSat design according to the values listed the section Evaluation and Scoring.