

Preliminary round Rule Book

ISRO ROBOTIC CHALLENGE-URSC 2025

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1 Background:

ISRO Robotics Challenge-URSC 2024 (IRoC-U 2024) provided an opportunity to the student community to showcase their engineering problem solving capabilities for space missions. The student community responded to IRoC-U 2024 with great enthusiasm, and its unprecedented success served as an inspiration for the next challenge IRoC-U 2025.

One of ISRO's future goal is the exploration of Martian surface and as a part of Martian surface exploration, an Autonomous Aerial Vehicle will carry out scientific activities. ISRO solicits from the youth of India, innovative ideas and designs in the area of navigation for future missions through the conduct of Robotics Challenge.

2 Challenge

The IRoC-U 2025 challenges the students to develop '**Autonomous Navigation for an Aerial Vehicle (ANAV)**' *without any external navigation aid like GNSS, pseudolite or reflector arrays with a tagline 'Fly me on MARS'*.

The challenge on Martian surface is non-availability of any external navigation aid like GNSS, pseudolite or reflector arrays. Hence, a dedicated navigation technique required for aerial vehicles for exploration of Martian surface. Hence current challenge focuses only on developing and demonstrating navigation and guidance techniques rather than building aerial vehicles. Students can use/develop any available (off-the-shelf) aerial vehicle complying with existing DGCA rules.

The student community needs to develop and demonstrate the autonomous capabilities of ANAV:

- a) for navigation and guidance without the aid of any external navigation.
- b) to identify safe landing spots and perform stable landing and take-off.

3 Tasks during the challenge:

ANAV has to perform the following tasks during the challenge during the various rounds.

- a) Stable Vertical take-off, hover and landing.
- b) ANAV shall scan the arena to identify the boundary, and the safe spots for landing.
- c) ANAV shall choose the sequence and stable landing at each safe spot.
- d) After safe landing, the ANAV shall return to the home position.

Note: Task details will be provided after preliminary rounds.

Identifying the target spots should not be based on the colour, and must be based on surface topography.

4 Schedule of the Events

#	Description	Date
1.	Announcement of the challenge and registration	20.11.2024
2.	Last date for submission of complete proposal for Preliminary round	15.12.2024
3.	Announcement of Selection of teams of Preliminary round	15.01.2025
4.	Commencement of Qualification round	16.01.2025
5.	Evaluation of Qualification round	16.03.2025 to 31.03.2025
6.	Announcement of results of Qualification round	1.04.2025
7.	Commencement of Elimination round	02.04.2025
8.	Evaluation of Elimination round	01.06.2025 to 15.06.2025
9.	Announcement of results of Elimination round	16.06.2025
10	Commencement of Final round	17.06.2025
11	Final field round and evaluation at the venue	25.07.2025 to 30.07.2025
12	Announcement of results	01.08.2025
13	Awards Ceremony on National Space Day at URSC	23.08.2025

Note:

1. The details of the challenge will be available after the registration.
2. Only one proposal per college will be entertained.
3. Organisers reserve the right to change the dates depending on exigency of situation / to refine the task details of the challenge.
4. All deadlines are at 8.30 PM (IST) on the respective dates.

5 Venue

The final onsite competition to perform the required tasks is planned to be conducted in U R Rao Satellite Centre (URSC), Bengaluru - 560017, in the month of July 2025. For information about the IRoC-U 2025 competition venue, please follow our updates on website 5.1.1.

5.1 Contact Information

5.1.1 **Website address:** <https://www.ursc.gov.in/IRoC-U2025>

5.1.2 Email address for Teams: irocu2025@ursc.gov.in

5.2 Awards and Recognitions

The first three teams will be awarded based on the evaluation by jury and fair play attitude of teams. Additionally, two consolation prizes will also be awarded. The awards in the form of cash is planned as follows:

1st place	Rs 10 Lakh
2nd place	Rs 7 Lakh
3rd place	Rs 5 Lakh
Consolation prize	Rs 2 Lakh
Prize for innovative and non-intuitive thinking	Rs 1 Lakh

The teams qualifying for the Field Round and participating on challenge day will be awarded with an appreciation certificate to each of the team members and mentors.

The teams qualifying for the Qualification and who have submitted the design report will be awarded with participation certificate to each of the team members and mentors. No certificates will be given to the teams who fail to submit the design report by the specified timeline.

5.3 Intellectual Property Rights

Intellectual properties (IPs) generated by the team qualifying for the Field Round during the IRoC-U 2025 challenge shall be sole property of ISRO/DOS. These teams shall enter into non-disclosure agreement with ISRO/DOS.

The ANAV design arrived by the teams qualifying for the Field round shall not be used by the teams in any other competition without the written consent of the ISRO/DOS.

5.4 Rules and regulations by Department of Civil Aviation:

The rules and regulations issued by Department of Civil Aviation shall be strictly followed. For more details on rules issued by Ministry of Civil Aviation please visit and follow <https://www.civilaviation.gov.in/ministry-documents/rules>

IRoC-U 2025 organizing team is not responsible for any violation of the rules issued by DGCA that are committed by the individual teams during any stage of the challenge.

6 PARTICIPATING TEAMS

6.1 Registration

All teams must complete the registration process on the website. The registration procedure includes:

1. Team login account creation.
2. Filling out the team details and download auto-generated registration form.
3. Get downloaded registration form duly certified by the Head of the institute.

4. Upload the softcopy of the proposal and the certified registration form in .pdf format (Proposal can be of maximum pages:30 with the file size limited to 15 MB).

NOTE: Registration shall deem to be completed only after uploading as per step 3 and 4.

6.2 Team formation

1. The competition is open to students of Indian origin studying in educational institutions located in India.
2. The team is to consist of bona-fide **students** pursuing (full time and non-sponsored) under graduation/post-graduation/research. Sponsored/External students are not eligible for participating in the IRoC-U 2025.
3. The team should consist of minimum of 3 members and maximum of 10 members excluding mentors.
4. Team can have at most two mentors, one of whom must be a faculty from the parent institute and other may be from the Parent Institute/ Industry.
5. Each team should identify one member as team lead.
6. *Any communication from the organisers will be sent to only team lead and any query/clarification should also be raised only using the team lead's registered email id. No response will be provided to the email addresses other than that of the registered email id.*

6.3 Selection Process

The selection process is detailed below. The number of teams selected from Prelims round will be based on the evaluation of the entries.

The number of teams selected for all the rounds is at discretion of the committee. The decision of the organisers in this regard will be final and binding.

- **Prelims Round requirement:** Registration and Submission of Proposal Report and presentation.
- **Qualification Round requirement:** Submission of Detailed Design Report and Demonstration of laboratory Prototype (Details shall be provided).
- **Elimination Round requirement:** Demonstration of ANAV in the simulated arena at the respective parent institute premises (Details shall be provided).
- **Field Round requirement:** The final onsite competition to perform the required tasks is planned to be conducted at URSC Bengaluru (Details shall be provided).

The present document outlines rules for the Preliminary round (the rules of subsequent rounds shall be uploaded).

7 Requirements of the various rounds

7.1 Preliminary round Report Submission

Each registered team must submit proposal. The proposal should introduce the team and provide explanation for the salient features/innovations of their proposal. It should confirm that the team has read, analysed and understood the task requirements.

The team needs to download the proposal report format and follow the guidelines provided in the document. The document (maximum 15 MB) needs to be uploaded on the website.

The details and rules of the subsequent rounds will be provided 1 day prior to the commencement of the respective rounds.

Note: Only one team from each institute is permitted to participate in the contest. It is the responsibility of the institute to select the team based on their established criteria. Furthermore, the chosen team must secure an endorsement from the head of the institution, confirming that they are the sole representatives for their institute in the competition. If more than one entry is found from any institute, first submitted proposal shall be entertained for the further rounds and the remaining proposals shall be rejected.

7.2 ANAV specification and requirements

Features:

- a) Hardware: Teams can develop or use readily available hardware platform. (Aerial vehicle)
- b) Mass of ANAV: limited to 2 kg.
- c) Compliances:
 - The teams need to specify in the proposal report the compliance of the proposed ANAV with respect to the specifications as per Table-1.
 - To meet the challenge as proposed, the use of satellite-based navigation systems, external markers, or local positioning systems is strictly prohibited, mirroring the challenges faced by an actual planetary ANAV on distant celestial body where traditional Earth-based navigation aids are unavailable.
 - ANAV shall have an emergency call off mode, in case of exigencies.

Table-1: Typical Specifications of Autonomous Navigation for an Aerial Vehicle (ANAV)

Sl. No.	Type	Description
1	Aerial Vehicle	Rotor Craft (Micro Drone, Mass < 2 kg) (As per Drone rules-2021, issued by Ministry of Civil Aviation as per the Gazette of India CG-DL-E-26082021-229221 or the latest version)
2	Software capabilities	Indigenously developed softwares/algorithms
3	Power Source	Battery operated only
4	Communication	RF radiation mode only
5	Slope landing capability	Minimum 15°

8 General Rules and Regulations

The ISRO Robotics Challenge, URSC – 2025, referred to as ‘IRoC-U 2025’ is owned, coordinated, operated and judged by IRoC-U 2025 organizing committee constituted by URSC consisting of experts across the ISRO Centres. By taking part in the IRoC-U 2025, teams agree to place a promotional sticker on their ANAV (max. size of the sticker: 10 cm X 10 cm).

8.1 Organisers’ Disclaimer

Teams SHALL take full responsibility for any damages, accidents or unsettling events caused by their hardware/software as well as for the members of the participating team. Teams are obliged to follow all safety and good conduct rules specified by the organisers. Any breach of safety rules and requirements will result in the disqualification of the team from the entire competition.

8.2 Changes to the Competition Rules

The organisers retain the right to effect any essential / inevitable changes to the competition rules. However, any changes introduced shall not impact the overall design of ANAV. All changes will be announced in advance and updated on the website.

8.3 Deadline Extension

The organisers retain the right to extend the deadline for any round. All deadline extensions will be announced in advance and details will be updated on the website.

8.4 FAQ

The relevant queries related to the challenge raised by the teams will be updated on FAQ section of the website. Queries to any challenge related questions that arise should be mailed to contact mail ID from team lead’s email ID with subject line FAQ. Teams are requested to check FAQ section before raising the query.

8.5 Challenge Scoring Issues

All issues with scoring during the challenge will be resolved solely by the independent jury. Teams cannot appeal to any other party.

8.6 Organisational Issues

Organisational issues, including team eligibility, conduct of challenge and execution of jury decisions will be resolved by the organisers.

8.7 General Challenge Issues

In case any conflict related to the challenge is encountered, the organisers’ decision will be considered as final and binding.

8.8 Disqualification

The organisers may disqualify a team in the event of a serious breach of the rules, safety regulations or fair play. The organiser’s decision shall be considered as final and binding. Teams cannot appeal to any other party including social media platforms.

8.9 Cancellation of Event

The organisers reserve the right to cancel the IRoC-U 2025 finals in the event of unforeseen circumstances preventing its safe conduct. In case of event cancellation, the organisers will inform the participating teams directly or through web portal.

8.10 Organiser's Responsibility

The organiser's civil liability is limited solely to the responsibility for organising the event in accordance with the local law and local regulations.

8.11 Copyright of the challenge

The organisers retain all copyright to the competition rules, logo, tagline and the description of the tasks. No alterations or additions to the competition rules can be made and their sale is forbidden. The rules can only be used or copied for the IROc-U 2025 connected activities (e.g. registration process).

8.12 Personal Data Storage

Team members agree to their personal data (registration data), the documentation delivered as well as other promotional materials and visuals being stored and processed in the organiser's computer systems for the purpose of the IROc-U 2025 programme.

The organiser shall keep all technical documentation confidential and shall not publish or disclose it to any third parties without prior approval from the respective team's representatives. The sole exception to this is the challenge's jury team – technical documentation will be disclosed to judges for scoring and mentoring purposes only.

The team members also give the organiser, parties designated by the organiser and the audience, the right to disclose and publish any photos, videos or other visuals, their names and surnames, identifiable pictures of themselves and any other persons, as well as pictures of machines, devices and equipment in any and all of the available formats, by any and every known method, in any and every known medium.

Teams grant permission to the organiser to use promotional materials and visuals (e.g. photos and videos), as well as any additional photos, videos, portraits, documents, interviews and other materials resulting from participation in the challenge (using the name of the participant or not) on all media, in any language, anywhere in the world, in any manner, for advertising and promotional purposes.

8.13 Miscellaneous

- Individuals or teams may be excluded from participation at the discretion of IROc-U 2025 for unauthorized behaviour, including but not limited to (i) impersonating a ISRO/DOS official whether intentionally or in a manner that results in confusion, (ii) misuse of the logos or identifiers of ISRO/DOS, any sponsoring organisation, or any infringement of a commercial logo or trademark, (iii) failure to abide by competition rules, directives or instructions from the competition host or organisers, and (iv) asserting or implying a ISRO/DOS affiliation or sponsorship where none exists.
- ISRO/DOS does not host pre-competitions or competitions conducted by any organisation other than organizers of IROc-U committee constituted by URSC. This IROc-U 2025 competition is neither affiliated with, nor sponsors or endorses any ANAV Challenge competition other than the IROc-U 2025. Outside competitions have no bearing on the IROc-U 2025 qualification or registration process, and representation to the contrary is strictly prohibited. No competition may imply any affiliation with ISRO/DOS or use the ISRO/DOS logo without permission of ISRO/DOS. Any assertions made by organisations that represent themselves as "ISRO/DOS", "Official ISRO/DOS ANAV Ambassador", "ISRO/DOS Judge", or any similar titles suggesting

a tie to ISRO/DOS are unauthorized. Representations or suggestions that any organisation or individual can assure teams of being accepted for registration or participation in the challenge are unauthorized. All requirements for participation in the IRoC-U 2025 are outlined in this rules book.

- Participant hereby waives any claims against ISRO/DOS, its employees, its related entities, (including, but not limited to, contractors and subcontractors at any tier, grantees, investigators, volunteers, customers, users, and their contractors and subcontractors, at any tier) and employees of ISRO/DOS's related entities for any injury, death, or property damage/loss arising from or related to the IRoC-U 2025, whether such injury, death, or property damage/loss arises through negligence or otherwise, except in the case of wilful misconduct. Any team member or advisor found to be exhibiting unsportsmanlike conduct may be disqualified from the challenge individually or as a team. All scoring decisions are final.
- Teams not meeting any requirement listed above may be disqualified.

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