



FIELD ROUND RULE BOOK VI.1

July 2024 U R Rao Satellite Centre

Field Round Rule Book V 1.1

23.07.2024

Contents

1.	PREAMBLE	4
2.	GENERAL INFORMATION	4
2.1.	Introduction to IRoC-U 2024	4
2.2.	Objectives of the Challenge	4
2.3.	Outcome for Student Community	5
2.4.	Schedule of the Events as on 23/07/2024	5
2.5.	Venue	5
2.6.	Contact Information	5
2.7.	Awards and Recognitions	5
2.8.	Financial Assistance	6
2.9.	Intellectual Property Rights	6
3.	FIELD ROUND REQUIREMENTS	7
3.1.	Pre-Field Round Checks	7
3.2.	Field Task	7
	3.2.1. Overview of the Field Task:	8
	3.2.2. Arena	9
	3.2.3 Task-1: Autonomous Navigation Task	10
	3.2.4 Task-2: Autonomous Sample Picking and Placing:	12
	3.2.5 Task-3: Repeat the Task-1 & Task-2 until all the samples are dropped in the sample container	13
	3.2.6 Task-4: Identification of specific markers	13
	3.2.7 Task time:	14
3.3.	Post-Field Round	14
4.	SCORING CRITERIA	15
4.1.	Overview	15
4.2.	Pre-Field Round Scoring Criteria	15
4.3.	Field Round Scoring Criteria	15
	4.3.1 Evaluation criteria field round	15
	4.3.2 Marking criteria for the particular entry:	17
	4.3.3 Marking criteria for the particular exit:	17
	4.3.4 Marking criteria for the particular sample tube (autonomous pick and drop):	17
5.	IMPORTANT GUIDELINES	18
Ann	exure: General Rules and Regulations	19
A1.	Organisers' Disclaimer	19
A2.	Changes to the Competition Rules	19

A3.	FAQ	19
A4.	Challenge Scoring Issues	19
A5.	Organisational Issues	19
A6.	General Challenge Issues	19
A7.	Disqualification	19
A8.	Cancellation of Event	19
A9.	Organisers' Responsibility	20
A10.	Copyright of the challenge	20
A11.	Personal Data Storage	20
A12.	Miscellaneous	20

Table of contents:

5
7
12
12
13

List of Figures

Figure 1: Known Elements in the arena	9
Figure 2: Sample Tube and Container location details	10
Figure 3: Exit position location details	11

1. PREAMBLE

Indian Space Research Organisation (ISRO) successfully landed Chandrayaan-3 Vikram on lunar surface and Pragyan explored near to the southern pole of Moon. Post this accomplishment, it is time to look at future robotic exploration missions to Moon and other planetary bodies. It has been a constant endeavour at ISRO that, we create unique opportunities for academia & industry to participate in the technology developmental activities commensurate with organisational objectives. In line with these objectives, U R Rao Satellite Centre (URSC) solicits from the youth of India, innovative ideas and designs of robotic rovers for future missions through the conduct of 'ISRO Robotics Challenge, URSC-2024'. This is an invitation for student community for design and realisation of a 'Wheeled/Legged Rover' encompassing the development of complete hardware and software. Details of the same are provided herewith. The objective here is to provide development opportunities in space robotics to the participating entities and to leverage the creative thinking among the youth of our Nation for ISRO interplanetary missions. It is also expected to play an important role in augmenting ISRO's activities in space exploration. All interested are encouraged to participate in this challenging competition and join hands with ISRO, towards the advancement of space science & technology in the country.

2. GENERAL INFORMATION

2.1. Introduction to IRoC-U 2024

ISRO is foraying into the development of state-of-the-art Space Robotics, Artificial Intelligence and Machine Learning technologies. The technologies are being developed to meet the futuristic mission needs of ISRO viz., ISRO In-orbit Servicer Mission, Lunar sample return mission, Docking in Space (SPADEX), Mars Lander Mission etc. This is conceived as a natural next step in this direction, when ISRO's Chandrayaan-3 mission accomplished landing and surface exploration using an indigenous Lander and Rover.

In order to provide a greater opportunity for the students of the country to provide innovative solutions in the area of space robotics, it is planned to organise "ISRO Robotics Challenge-URSC 2024 (IRoC-U 2024)" with a tagline of "Let's build a space robot". The solutions provided by the students in IRoC-U 2024 have the greater chances of getting incorporated into ISRO's future interplanetary robotics missions.

IRoC-U 2024 consists of an engineering project where the Institutional teams build robots to compete on an extra-terrestrial inspired arena, performing tasks based on the real-life challenges faced by space robotics. IRoC-U is being planned as a platform for co-development of technologies in the area of space robotics through organising challenges.

2.2. Objectives of the Challenge

- a. To provide a standardised platform for exploring the area of space robotics.
- b. To develop a deeper understanding of space robotics and its applications among student community. It enhances their communication, collaboration, inquiry, problem solving and flexibility skills that will benefit them in their academic and professional lives.
- c. To co-develop (students and ISRO) future technologies needed in the area of space robotics.

2.3. Outcome for Student Community

- a. Identify, formulate, and solve complex engineering problems by applying principles of mathematics, science and engineering.
- b. Apply engineering design to produce solutions that meet specified needs.
- c. Communicate effectively.
- d. Collaborate with a team, provide inclusive leadership, establish goals, plan tasks, and meet objectives.
- e. Formulate and conduct appropriate experiments, analyse and interpret test and analytical data and use engineering judgment to draw conclusions.

2.4. Schedule of the Events as on 23/07/2024

This challenge is a milestone-based event with continuous evaluation till the completion of the award ceremony. This section provides the list of milestones for the selected teams in field round, IRoC-U 2024. The timeline with important dates are as follows:

Table 1: Schedule of events			
#	Description	Date	
		03.08.2024	
1.	Team Preparation Day	to	
		04.08.2024	
		05.08.2024	
2.	ISRO Robotics Challenge Day	and	
		06.08.2024	
2	Amonda Commony on National Space Day	22.09.2024	
3.	Awards Ceremony on National Space Day	23.08.2024	

Note 1: Organisers reserve the right to change the dates depending on exigency of situation.

Note 2: Organisers reserve the right to refine the task details of the challenge as we progress.

2.5. Venue

The venue for the field task is in Mangaldhama multi utility hall (ISRO). The location is of the same is: <u>https://maps.app.goo.gl/j23DQjNzvwEQq6cT6</u>

2.6. Contact Information

Website address: https://www.ursc.gov.in/IRoC-U2024

Email address for Teams: irocu2024@ursc.gov.in

2.7. 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 are also planned. The awards in the form of cash and institute trophy are planned as follows:

1st place	Rs 5.0 Lakhs along with Institute trophy
2nd place	Rs 3.0 Lakhs along with Institute trophy
3rd place	Rs 2.0 Lakhs along with Institute trophy
Two consolation prizes	Rs 1.0 Lakh each along with Institute trophy

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 Quals 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.

First three Prize winning rovers (viz., places 1st, 2nd and 3rd) will get commemorative sticker placed on it by the organisers for each place.

2.8. Financial Assistance

Each team qualifying for the Field Round and participating on the challenge day will be provided with financial assistance of Rs 2.0 Lakhs.

2.9. Intellectual Property Rights

Intellectual properties (IPs) generated by the team qualifying for the Field Round during the IRoC-U 2024 challenge shall be sole property of URSC-ISRO. These teams shall enter into non-disclosure agreement with URSC-ISRO.

The rover design arrived by the teams qualified for the Field round shall not be used by the teams in any other competition without the written consent of the organisers.

3. FIELD ROUND REQUIREMENTS

Field round is designed in such a way that a rover can experience similar environment as is envisaged on any other planetary body by ISRO's sample return missions. In such scenarios rover should examine the terrain based on its on-board instruments, traverse to the desired area, collect surface samples of the lunar/planetary soil and return to the required location. Field Round Rover should be similar to Qual round design with changes. The field Round is divided into three parts:

- Pre-field Round Checks
- Field Task
- Post-field presentation

3.1. Pre-Field Round Checks

- a. Physical Checks: Rover should comply with mass, dimension as mentioned in the Table-1. These will be verified prior to task
- b. Emergency Check: Rover should be capable of ceasing any operation in case of emergency, thus Kill Switch Verification will be done prior to field test.

Table 2: Rover specifications			
1	Туре	Wheeled/Legged	
2	End to End Dimension (Rover Alone) Length X Breadth X Height	< 1 m X 1 m X 0.8 m	
3	Mass (Rover with Manipulator arm)	< 50 kg	
4	Slope climbing capability	Minimum 15°	
5	Obstacle climbing capability on slope	Minimum height of 150 mm (No colour coding is employed for obstacles and craters)	
6	Power Source	Battery operated only	
7	Communication	RF link(s) in radiation mode only	
8	Gravity	Under Earth's Gravity	

3.2. Field Task

In the field round, rover needs to traverse through an arena of size 12 m x 9 m while performing required tasks. There will be three samples placed at specified locations in the arena.

3.2.1. Overview of the Field Task:

- a. Team members will place the rover inside one of the parking areas marked at each entry points.
- b. Rover has to traverse and arrive at the parking area at one of the exit points.
- c. The tasks are identified as:
 - 1. Task-1: Autonomous Navigation (mandatory)
 - 2. Task-2: Autonomous Sample pick and drop (mandatory)
 - 3. Task-3: Repeat the Task-1 & Task-2 until all the samples are dropped in the sample container
 - 4. Task-4: Identification of bonus markers
- d. During the task rover must autonomously plan a safe path to:
 - 1. [Task-1a] arrive at sample location
 - 2. [Task-2a] pick the sample
 - 3. [Task-1b] carry the sample to the drop location
 - 4. [Task-2b] drop the sample
 - 5. [Task-3: all 3 samples] repeat steps (1)-(4) for the remaining two samples
 - 6. [Task-1c] arrive at exit location
 - 7. [Task-4: Identification of bonus markers] search for and identify bonus markers located randomly in the terrain

Knowns:

- 1. The position coordinates will be provided for
 - i. sample tubes
 - ii. container
 - iii. entry and exit points
 - iv. photos of traversable obstacles will be shared

Unknowns:

- 1. The obstacles (Traversable & Non-traversable) and craters (Traversable) will be randomly distributed. The participants will not be provided with any details regarding the coordinates of obstacles and craters.
- 2. Coordinates of the bonus markers placed in the arena will not be provided.

3.2.2. Arena



Entry -2

Figure 1: Known Elements in the arena

- A. Size of the arena: 12 m X 9 m.
- B. Known elements in the arena:
 - a) 4 m dia. traversable crater with a depth of 200 mm and the slope of the rim is $< 15^{\circ}$
 - b) 2.5 m dia. traversable hump with a height of 260 mm made up of M-sand
 - c) Hard terrain
 - d) Non-traversable wall of height of 0.8 m
 - e) Traversable slot with a length of 1.8 m, width of 0.6 m and depth of 100 mm
- C. Filling material of arena: M-Sand (100 mm depth)
- D. Entry Points: 2 Entry points are provided with different difficulty levels. Team can choose any point as per their rover capability. Choosing difficult entry (entry-1) will have more scoring weightage. Please refer section 4 for scoring criteria. Width of entry point will be nearly 1.5m.
- E. Sample: In total, 3 samples will be present in the arena at three different locations with different difficulty level. A rover can pick any number of samples in the given time. Please refer section 4 for scoring criteria
- F. Identification Markers: Few bonus markers will be placed in the arena at random locations. The locations may vary for each team. Bonus markers will be coloured and star-shaped.

- G. Traversable Obstacles: Obstacles of random shape/sizes (the size of the sample will the limited within 150x150x150 mm) will be distributed within the arena at unknown locations.
- H. Non-traversable obstacles: These obstacles of random shape/size (300x300x300 mm > x > 800x800x800 mm) will be placed randomly. These obstacles are meant to be avoided. There is no limitation in the size of these obstacles
- I. Craters: Craters are created at random locations and depth of the craters will be limited within 200 mm.
- J. Hard Terrain: Hard surface without any M- Sand will be present within arena which is traversable and it will be flushed to m-sand height.
- K. Exit Points: 2 Exit points are provided. Team can choose any point as per their convenience. Choosing exit-1 will fetch more weightage of marks
- L. Boundary: 200 mm boundary edges will be provided and marked with yellow paint for clear demarcation
- M. Separation between any two non-traversable obstacles will be maintained more than 1m.

Note: Number and coordinates of traversable obstacles, non-traversable obstacles and craters will not be disclosed.



3.2.3 Task-1: Autonomous Navigation Task

Figure 2: Sample Tube and Container location details



Figure 3: Exit position location details

The team is required to design and demonstrate the performance of rover's navigation by traversing from entry point to sample collection point (of the choice the team) and subsequently to the container point and then exit from one of the identified locations. Rover can traverse in any path.

The teams are allowed to give maximum 4 commands if required in the total task at the following checkpoint which are as follows:

- 1. At the start of the task (at entry point-1 or 2)
- 2. After the drop of first sample
- 3. After the drop of second sample
- 4. After the drop of third sample

Following navigation tasks needs to be performed:

- a) Entry: The team can choose from two available options. Entry-1 will fetch more points.
- b) Obstacle identification using sensors: The sensors shall be capable of identifying the dimension of the obstacles and take appropriate decisions.
- c) Craters identification using sensors: The sensors shall be capable of identifying the size of the craters.
- d) Sample location identification: OD 80 mm, L 125 mm (approx.) red in colour
- e) Container location identification: A cylindrical container of diameter 150 mm and height 150 mm, which is placed at the target location, needs to be identified

- f) Locations of the sample tubes (centre axis):
 - 1. Sample Tube-1: (3.5 m, 6.5 m) placed inside the 4 m traversable crater
 - 2. Sample Tube -2: (9.9 m, 1.35 m) placed on the 2.5 m traversable hump
 - 3. Sample Tube-3: (8 m, 6 m) placed on the hard terrain
- g) Locations of the sample container (centre axis): (11.5 m, 8.3 m)
- h) Exit parking:
 - 1. Exit-1 position: 1.5 m x 1.5 m square with a centre of (11.3 m, 4.35 m)
 - 2. Exit-2 position: 1.5 m x 1.5 m square with a centre of (8.83 m, 8.3 m)

Note: The sample tube, container and exit locations coordinates can have \pm 0.5m variation from the above-mentioned coordinates

i) The boundary will be marked with yellow for clear distinction. The entry and exit boxes will be marked with white boundaries

3.2.4 Task-2: Autonomous Sample Picking and Placing:

- The sample pick and-place task needs to be accomplished by a manipulator arm mounted on the chassis.
- Target identification using visual sensors: A tube which represents sample to be collected forms the target for the Rover. Following are the details of the sample that needs to be identified successfully before being picked up:

Details of sample (tube):

Table 3: Sample Tube specifications			
1	Mass	~ 200 gm	
2	Material	ABS	
3	Shape	Hollow Cylinder with closed ends	
4	Size	ID 67 mm & OD 80 mm, L 125 mm (Approx.)	
5	Colour	Red	

Details of sample container:

Table 4: Container specifications				
1	Shape	Hollow Cylinder one side closed and other side with a flange		
2	Cylinder Size	ID 140 mm, OD 150 mm, L 200 mm		
3	Flange	ID 140 mm, OD 200 mm, Thickness 5 mm		
3	Colour	Blue		

- Picking and securely holding the sample: The sample tube needs to be picked up from the surface using a gripper. The sample then needs to be held securely by the rover before mobility is initiated
- Unloading and placement: The rover needs to approach and unload the sample into the cylindrical container.
- After each drop of sample tube in the container it will be removed from the container, making place for the next sample tube.
- Picking and Dropping of each sample is an independent event and rover should handle only one sample at any point of time.

Note: The sample tube can be placed in any orientation at its designated location

3.2.5 Task-3: Repeat the Task-1 & Task-2 until all the samples are dropped in the sample container

The rover needs to repeat the Task-1 & Task-2 until all the samples Are dropped in the sample container. Only change is the rover will be at sample container location after drop of 1st sample and 2nd sample. The scoring criteria for pick and drop of each sample is provided in the section 4.3.1.

3.2.6 Task-4: Identification of specific markers

Identification of bonus targets includes the following:

- 1. Capturing its images/shape with some sensor.
- 2. All the bonus targets are marked with distinctive number and the team also needs to identify the number
- 3. Coordinates of the particular bonus target to be identified with a variation of ± 0.5 m

Details of the Bonus marks:

Table 5: Bonus marks specifications			
1	No. of bonus marks	5 No's	
2	Shape	5 pointed star with 72° angle between each 2 points	
3	Size	Circle connecting 5 points of a star will have a dia. 100 mm	
4	Positioning	Can be vertical or horizontal	
5	Colour	Background – Green Number – Black	

The full marks for the identification of bonus marks will only be allotted if a proof of detection and allotted number are provided along with coordinates. However, a partial mark will be given if all the requirements are not satisfied.

3.2.7 Task time:

Total time available to execute all the field tasks is 40 minutes and a 20 minutes slot will be provided for the team for setup their rover before the task.

3.3. Post-Field Round

In post-field round there will be a Q&A session of 20 mins. There will be no marking in this round.

4. SCORING CRITERIA

4.1. Overview

#	Round	Total marks
1	Pre-Field	Mandatory
2	Field	100
3	Post -Field	-

4.2. Pre-Field Round Scoring Criteria

#	Evaluated Parameter	Description of evaluated parameter	Weightage of marks
1	Rover measurements	Weight of the rover Length X Breadth X Height of the rover	Mandatory
2	Kill Switch	Demonstration	

4.3. Field Round Scoring Criteria

4.3.1 Evaluation criteria field round

Demonstration of safe path navigation and sample pick and drop at correct location, it will is the minimum requirement to qualify for evaluation parameter considered below:

#	Evaluated Parameter	Description of evaluated parameter	Marks	Total marks without penalty
1	Entry Point selection	Only be awarded if entry-1 is chosen (find detailed criteria in section 4.3.2)	4	4
2	Autonomous Sample Pick	Scoring if all samples are picked (find detailed criteria in section 4.3.3)	16	19
		Accuracy in sample picking (no. of the attempts taken to pick the sample)	3 (if all 3 samples are picked in first attempt)	
		Dropping of the sample during pick-up (penalty)	-1 x (no. of samples crushed)	
3	Autonomous Sample Drop in container	Scoring of all samples Dropped in container (find detailed criteria in section 4.3.4)	12	15

		Accuracy in sample placement (no. of the attempts taken to correctly place the sample)	3 (if all 3 samples are dropped in first attempt)	
4	Autonomous Navigation	Successful autonomous navigation	30	
		Sample Drop (penalty)	-1 x (each drop)	30
		Rover toppling (penalty)	- 5	
		Collision/Contact with the non-	-0.5 x (each	
		traversable obstacles (penalty)	contact)	
		Autonomous to commanded (penalty)	-15	
5	Autonomous Exit parking	Maximum marks for parking in the exit box (find detailed criteria in section 4.3.3)	4	4
6	Mobility System	Capability Demonstration (wheels climbing obstacles, hard terrain mobility, climbing slopes and wheel traversing crater)	5	5
7	Live telemetry feed	Sensor data and live path planning graph etc	3	
		Obstacle, Crater, Sample tube and Sample container detection images with bounding boxes	3	6
8	Star markers identification	No of markers identified	1.4 x (No. of bonus marks identified)	7
9	Optimization of resources and performance	Minimum time taken (Relative scoring)	8 (Relative scoring)	8 (Relative scoring)
10	Rover Health after Task Completion	Overall state of parts, battery, electronics.	2	2

Note: Switching from autonomous to commanded mode with penalty points. Scoring will ensure that more marks are awarded to autonomous mode with poor performance than good performance with commanded mode. Albeit, prime importance is given to dropping off sample in the container. Consider the following milestones listed in descending order of importance/priority (i.e. milestone-1 is most important) while satisfying time constraint.

- 1. Successful autonomous sample pick and drop in container (34 %)
- 2. Autonomous mode navigation (30 %)
- 3. Time constraint (8%)
- 4. Star markers identification (7%)

4.3.2 Marking criteria for the particular entry:

The entry marks will only the awarded to the if the rover successfully avoids any contact with the non-traversable wall during its navigation from its start point. The weightage of marks for selection of any of the entries is as below:

- Entry-1: 4%
- Entry-2: 0%

4.3.3 Marking criteria for the particular exit:

The weightage of marks for selection of any of the entries is as below:

- Exit-1: 4%
- Exit-2: 2%

Evaluation will be based on accuracy of parking in the 1.5 x 1.5 m parking box.

4.3.4 Marking criteria for the particular sample tube (autonomous pick and drop):

Picking of each sample tube will have different weightage of marks:

- Sample Tube-1 (placed inside the 4 m traversable crater): 6 %
- Sample Tube-2 (placed on the 2.5 m traversable hump): 6 %
- Sample Tube-3 (placed on the hard terrain): 4 %

Dropping of each sample tube will have same weightage of marks:

- Sample Tube -1: 4 %
- Sample Tube-2: 4 %
- Sample Tube-3: 4 %

5. IMPORTANT GUIDELINES

- 1. Consider the arena as an extra-terrestrial surface and do not venture into the unknown! Only exception allowed is for operation of kill switch during emergency. If there is any setback in the rover during the task and stopped working only 2 identified members (apriori) from the team will be allowed into the arena.
- 2. All three rounds (pre, field, post) must be cleared to qualify for marking and prizes.
- 3. Field round will be considered cleared full if all 4 tasks are completed successfully.
- 4. The rover is expected to navigate to the sample of interest as well as to the container into which the sample has to be placed.
- 5. The rover shall finally reach one of the exit box and park itself in that position.
- 6. If a team is unable to demonstrate safe path navigation and sample pick and drop at correct location, it will not be considered for evaluation. Dropping the sample at correct location is the minimum requirement to qualify for evaluation.
- 7. Mandatory operations of the field round need to be carried out autonomously by the Rover with inputs derived from its sensors and based on the logic/intelligence built into the Rover.
- 8. If a team is unable to demonstrate mandatory tasks in autonomous mode, they can switch to commanded mode and operate their rovers to complete mandatory tasks. This will however attract penalty points. Teams using autonomous mode for completing mandatory tasks will be given preference. The change to commanded mode must be conveyed before switching to the organizers by the team.
- 9. Rover losing stability and/or falling during traversal will attract negative points.
- 10. No negative marking for using the kill switch. However, time taken to restart rover operations after kill switch will be considered in the total time which is limited.
- 11. The battery capacity has to be large enough to ensure that there is no need to change/charge the battery during any of the tasks
- 12. The rovers having minimum mass, power consumption, overall size while displaying the ability to complete the tasks in minimum time will be duly recognized during the evaluation process.
- 13. Usage of readymade robotics kits is strictly prohibited.
- 14. Teams are required to build their own rover. Teams are recommended to use COTS (Commercial-Off-The-Shelf) components.

Annexure: General Rules and Regulations

The ISRO Robotics Challenge, URSC – 2024, referred to as 'IRoC-U 2024' is owned, coordinated, operated and judged by U R Rao Satellite Centre, Bengaluru.

A1. 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 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.

A2. 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 rover. All changes will be announced in advance and updated on the website.

A3. FAQ

The query 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.

A4. 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.

A5. Organisational Issues

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

A6. General Challenge Issues

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

A7. Disqualification

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

A8. Cancellation of Event

The organisers reserve the right to cancel the IRoC-U 2024 finals in the event of circumstances preventing its safe organisation. In case of event cancellation, the organisers will decide on the alternative approach and present it to the Teams affected by the decision.

A9. Organisers' Responsibility

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

A10. 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 expressly forbidden. The rules can only be used or copied for the IRoC-U 2024 connected activities (e.g. registration process).

A11. Personal Data Storage

Team members agree to store their personal 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 2024 programme.

On the other hand, the organiser will keep all technical documentation confidential and will not publish or disclose it to any third parties without prior approval from the 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.

A12. Miscellaneous

- Individuals or teams may be excluded from participation at the discretion of URSC/ISRO for unauthorized behaviour, including but not limited to (i) impersonating a URSC/ISRO official whether intentionally or in a manner that results in confusion, (ii) misuse of the logos or identifiers of URSC/ISRO, 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 URSC/ISRO affiliation or sponsorship where none exists.
- URSC/ISRO does not host pre-competitions or competitions conducted by any organisation other than URSC. This URSC competition is neither affiliated with, nor sponsors or endorses any Rover Challenge competition other than the IRoC-U 2024. Outside competitions have no bearing on the IRoC-U 2024 qualification or registration process, and representation to the contrary is strictly prohibited. No competition may imply any affiliation with URSC/ISRO or use the URSC/ISRO logo without permission

of URSC/ISRO Headquarters. Any assertions made by organisations that represent themselves as "URSC/ISRO", "Official URSC/ISRO Rover Ambassador", "URSC/ISRO Judge", or any similar titles suggesting a tie to URSC/ISRO 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 2024 are outlined in this rules book.

- Participant hereby waives any claims against URSC/ISRO, 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 URSC/ISRO's related entities for any injury, death, or property damage/loss arising from or related to the IRoC-U 2024, 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. If an appeal is warranted, the advisor or the team leader shall submit the appeal in writing for consideration to the Activity Lead within 30 minutes of the posting of score(s) in question. The final decision of the Activity Lead and Head Judges shall prevail.
- Students on the team will do 100% of the project, including design, construction of their vehicle and task components (including performing work that is supported by a professional machinist for the purpose of training or safety), written reports, presentations, and competition preparation. Any team found in violation of this will be disqualified. Excessive use of past work will result in disqualification, but teams may use vehicles designed in 2020-2023.
- Teams not meeting any requirement listed may be disqualified.



U R Rao Satellite Centre Vimanapura Post, Bengaluru