

1 Challenge Introduction

The International Space Challenge is an annual technical design competition organised by the Space Faculty Pte Ltd. It challenges youths aged 13 – 25 years old to design complex space-related, high-technology projects that are largely graded based on creative engineering. ISC captures the imagination of youths and directs their creative enthusiasm towards developing innovative science and engineering solutions across many fields.

This interesting and dynamic platform can inspire and encourage more students to consider furthering their studies in the areas of STEM. Through the years, ISC has grown in prominence and attracts the best brains around the world to participate. Working in teams to solve problems defined closely with the industry, participants derive theoretical models, design prototypes, create simulations of their creative solutions.

The challenge is split into two tracks: Starter and Advanced to better engage youths of all ages, educational backgrounds, and skill level. The starter track focuses on youths aged 13 to 18 years old and is designed to raise awareness about the diversity of the Space Tech Industry and spark their curiosity to explore more. The advanced track, on the other hand, is structured to hone the skills of youths who are already interested in the field and aim to pursue a career in the space and related high technology industries. Advanced category proposals are highly innovative with potential for further development after the challenge to increase their TRL.

1.1 Categories

	Starter Category	Advanced Category
Age	13 – 18 years old	15 – 25 years old
Objective	Select a past or present satellite mission lacking AI-capabilities and design and innovative AI solution to improve its performance, resilience, or operational efficiency	
Prizes		
Top Prize	SGD 2,000 (x1)	SGD 10,000 (x1)
Distinction	SGD 1,000 (up to 2)	SGD 1,000 (up to 2)
Merit	SGD 500 (up to 3)	SGD 500 (up to 3)

* All ISC participants will get **free entry** to Expand Space

1.2 Eligibility

- Age as of 31st December 2025:
 - o Starter: 13 to 18 years old
 - o Advanced: 15 to 25 years old
- Teams: 3 to 4 members
- Any educational background, STEM or non-STEM
- Any nationality and based anywhere in the world
- Open to students and early career professionals
- Valid e-mail address

1.3 Timeline

The 18th ISC will take place from **March 2025 and end by 26-28 November 2025.**

The tentative schedule is as follows:

Dates (2025)	Activity	Mode
March 2025	ISC Opens	Singapore & online
March to 1 September	Registration	Online
1 July to 1 September	Webinars, talks, expert sessions, hang outs	Online
September	Mentoring Sessions	Online
12 October	Project Submissions	Online
26 to 28 November	EXPAND SPACE: Awards Ceremony	Singapore & online

1.4 Communication Channels

All official communication related to the competition will be conducted through the following primary channels:

1. Official website
2. Email addresses provided during registration
3. Space Faculty Learning Portal
4. Discord Server

Website

Participants are encouraged to regularly check the official competition website at www.spacefaculty.asia for important announcements, updates, and notifications.

Email Communication

Important information will be sent to the email addresses provided during registration. Participants must ensure that the email address provided during registration is accurate and regularly monitored. The organizing committee will not be responsible for any consequences arising from participants not receiving important communications due to wrong addresses, unchecked or wrongly filtered emails.

Space Faculty Learning Portal

Participants are required to join the official Space Faculty Learning Portal at www.spacefaculty.co using the provided invitation link you will receive upon registration. Recordings of the webinars as well as mission brief documents and other relevant slides or data will only be available on our learning portal.

Discord Communication

A dedicated Discord server will be set up for the competition, serving as a platform for real-time communication, community interaction, and updates. Participants will be able to join the official Discord server using the provided invitation link upon registration. Important announcements and clarifications may be made through Discord, and participants are expected to check the relevant channels regularly.

2 Challenge Overview

Artificial Intelligence – the ability of computers to carry out tasks usually associated with human thinking, learning, problem-solving or decision-making – has been a topic of research and discussion for more than 50 years. However, only in recent years has AI boomed and become available to the wider public. While AI tools like chatbots and image generators are excellent tools that can support a number of tasks, there's so much more depth into how AI works.

This 18th edition of the International Space Challenge invites participants to go one step further, pushing the boundaries of their knowledge in AI by exploring its applications in space: for Earth's benefit or for the advancement of space exploration. The challenge will encourage participants to discover how AI can transform space technology, while also addressing important strategic issues and operational challenges in this demanding environment.

Throughout the challenge, participants will develop AI-based solutions for space applications. A series of webinars, mentoring sessions and additional resources will take participants beyond the fundamentals of AI – understanding the roles of Machine Learning, Deep Learning, Neural Networks, Foundation Models or Generative AI and even Ethics and Regulatory considerations in the broader context of AI.

18TH ISC THEME
UNLOCKING SPACE
CAPABILITIES THROUGH AI

2.1 Challenge Statement

Teams are tasked with designing an AI-based solution that addresses a key aspect in space technology. Ultimately, the goal of the proposed solution is to improve the mission outcome, optimize resources, or provide insights through AI, which would otherwise be very challenging to achieve.

The objective is to **select a past or present satellite mission lacking AI-capabilities** and **design and innovative AI solution** to improve its performance, resilience, or operational efficiency. Proposals must integrate hardware considerations and address real space challenges, including issues relevant to space sustainability.

1. **Level up the core technology:** Teams are encouraged to explore how AI might be deployed to augment both the contemporary and new or emerging issues concerning:
 - a. Space debris; how might AI-enabled systems on satellites and spacecrafts help autonomously reduce the risk of space debris – by self-deorbiting, disassembling, recycling or even reconfiguring themselves to minimize debris and congestion in orbit.
 - b. Space situational awareness e.g., space object/satellite monitoring and tracking that can facilitate conjunction (i.e. collision between space objects) risks in space
2. **Improve the use of strategic resources for space/satellite:** Teams are encouraged to explore how AI-based solutions can help meet the increasing demand for resources in space while ensuring the long-term sustainability of its use.
 - a. Driving efficient and effective use of radio-frequency spectrum and space orbital slots.
 - b. Identify, recover or reuse valuable materials from old satellites or debris to extend mission life and reduce waste in orbit
3. **Choose your own adventure:** tackle a real space challenge (satellites, space stations or rovers) and address how would you implement an AI-enabled solution.

2.2 Deliverables

- **Written concept proposal report** no longer than (not including Cover Page, Content Page, References and Annex):
 - **Starter:** no longer than 10 pages
 - **Advanced:** no longer than 40 pages
 - The report should contain:
 - Abstract
 - Introduction including:
 - Literature review related to the selected mission
 - State of the art of the chosen application
 - Clearly defined objectives of the proposed solution
 - Mission specifications
 - Solution
 - Analysis
 - Model architecture
 - Datasets description
 - Expected or simulated outcomes
 - Hardware feasibility and upgrades
 - Ethical and regulatory considerations
 - Trade off analysis
 - Preliminary results (if available)
 - Project Management and Expected Budget
 - AI usage disclosure to develop the proposal project (writing, images, etc)
 - Conclusions
- **Starter:** **A0 Research poster** explaining your project
- **Advanced:** **Video presentation** explaining your proposal (no longer than 8 minutes)
- *Optional:* a demonstration of the solution or mock-up

2.3 Judging Rubrics

Criteria & Assessment	Max Points
Technical Relevance and Feasibility The proposal is technically sound, feasible for space and clearly explained. Solution operates autonomously with limited human interaction and realistic resource needs. Risks are carefully considered.	35
Innovation and Creativity The proposal concept and design are novel, technical innovation and creativity are apparent. The innovation and use of selected technologies is well understood and justified.	30
Environmental, Ethical and Sustainability Considerations Project reflects commitment to sustainable space operations (e.g., debris reduction, minimal harm). Ethical and regulatory practices and considerations are included	10
Project Management and Financials The team shows an understanding of project management, timeline and budget to complete the project.	15
Submission Quality Report: The report is easy to read, submission is well-structured and organized, using headings and sub-headings, relevant figures and it's proofread. Report adheres to challenge statement deliverables guidelines. Starter Poster: Submission of A0 research poster Advanced Video: Submission of video presentation of up to 8 minutes.	10
Total	100

Bonus Points	Up to
<u>Mock Up or Simulation (10 points)</u> - Team has prepared a mock up or a simulation of the project. Mock up can be presented in person during Expand Space (10 points) or over a video recording (5 points) (up to 3 minutes)	15
<u>Social Media (up to 5 points)</u> - Social media posts (1 point per post) on one of the following platforms: Instagram, LinkedIn. Space Faculty's account must be tagged, and these hashtags must be used in the post: #SpaceFaculty, #ISC #ISC18 #18thISC, #InternationalSpaceChallenge, #ExpandSpace (include post screenshots in the submission Annexes!)	

Rules and Regulations

Teams

- Size: 3 to 4 members
- If your team has less than 3 members, we can help you connect with other participants
- Ages (as of 31 December 2025):
 - o Starter: 13 to 18
 - o Advanced: 15 to 25
- Located anywhere in the world
- Any nationality
- From a specific institution or “Independent” if the members are from different institutions
- Participants can join from any educational background (STEM or non-STEM), teams with mixed backgrounds are encouraged.
- Team Name: make sure you **choose a good name and remember it!** If you win, your team’s name will be called!

Plagiarism

- Reports will be checked for plagiarism, and teams with plagiarised content and ideas will be penalized.

Generative AI

- The use of generative AI (e.g. ChatGPT, Gemini, Copilot, DALL-E, Deepseek, Manus, etc.) is allowed for content, image, or video creation within reason, however participants **must include** a section detailing **which parts of the report have benefited from Generative AI** and the **prompts used** to this end.
- Note that **this is mandatory** if you have used GenAI, failure to do include this statement will be penalized when use of Generative AI is detected by the review committee.
- Heavy and non-critical use of such tools (even if reported) will be penalized.

Submission

- We will be sending out a submission form for each team to upload their projects when the submission deadline is approaching.
- Late submissions will not be considered.
- Report should not exceed 10 MB
- Poster should not exceed 1 GB
- Video shall be submitted via URL of your choice through the submission form (Drive storage, YouTube, Vimeo,...) – make sure we have access to it!

Language

- Reports, posters and presentations must be submitted in English.

Participation Certificates

- Digital participation certificates will be sent to all members of teams who submit the proposal and complete the feedback form at the end of the challenge.

Intellectual Property

- Space Faculty will not retain the intellectual property rights of the submitted ideas; however, Space Faculty reserves the right to use certain materials for marketing purposes.

Prizes

- Prizes worth up to SGD 25,000 distributed amongst the winners of the different categories.
- Participation Certificates by Space Faculty and supporting organizations.

Failure to adhere to ISC's Rules & Regulations can result in team disqualification.