Interstellar Transport Challenge

Introduction: The interstellar transport mission is divided into two parts: material collection and laboratory module docking. There are two routes for collecting materials. Participants need to draw on-site to determine the collection route, then start from the material collection area, collect target objects along the way, and arrive at the preparation area. After entering the starting area, they need to dock with the space station to complete the material transport task. This project can cultivate participants' early programming skills and logical thinking.

≤6 years old

Rules Revision v1-2026.3.18

Rules incorporated into ROBOBOOM

Project Background:

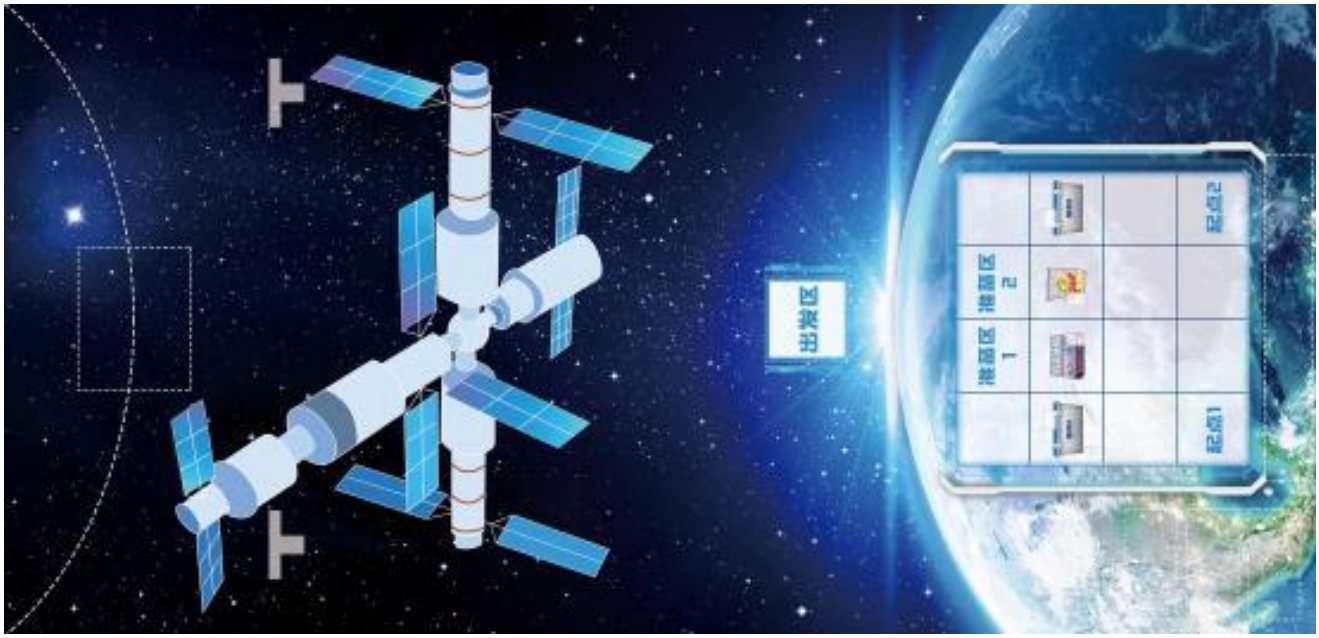
With the rapid iteration of human spaceflight endeavors, space exploration has gradually moved from a distant vision to reality. As a core hub connecting Earth with outer space, interstellar transport has become a key link supporting deep space exploration, space habitation, and resource development.

The International Space Station (ISS), as humanity's permanent inhabited base in low Earth orbit, serves not only as a forefront for space science research but also as a core experimental platform for testing interstellar transport technologies and honing the reliability of transport systems, carrying the important mission of humanity's advance into deeper space. It is the largest space platform in orbit, constructed, operated, and used by multiple nations jointly, equipped with modern scientific research facilities, enabling large-scale multidisciplinary basic and applied scientific research.

Now, the space station has officially released the material supply and laboratory module docking mission. Young robot engineers who love science, are you ready?

1. Competition Field

A. An example of the field diagram is as follows, dimensions 1.1m × 2.3m.



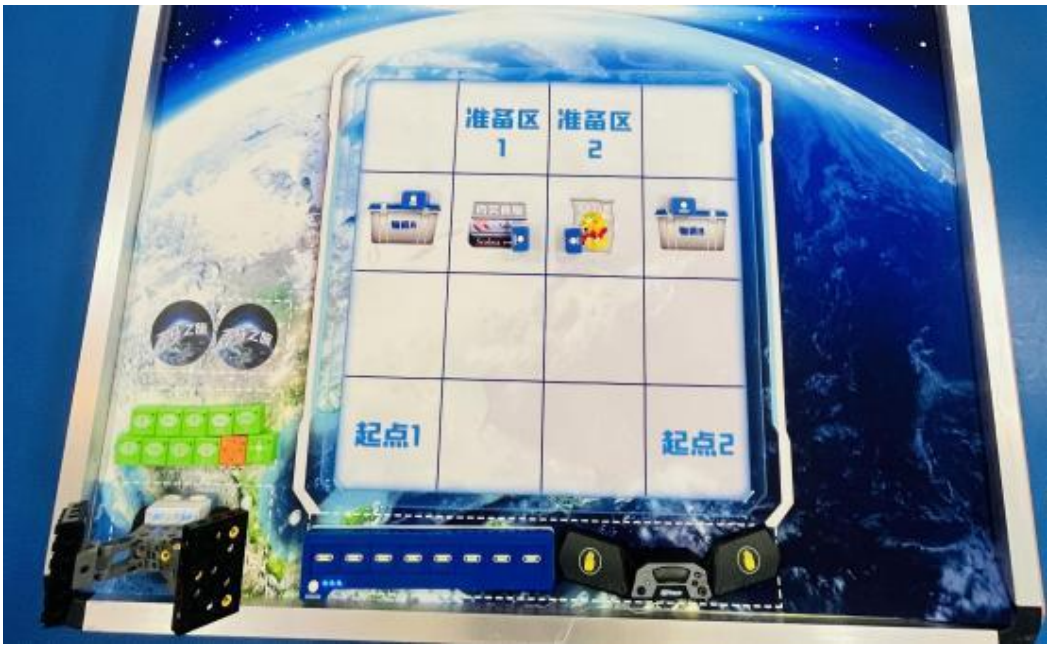
B. Examples of props are as follows (card material is PVC, specification is a circle with a diameter of 8cm).

C. The initial placement position of the robot is within the dashed box at the bottom left of the field.

D. Programming modules (placed randomly, placement order is not limited) are placed in the dashed box above the robot.

E. Route cards are placed in the dashed box above the programming modules.

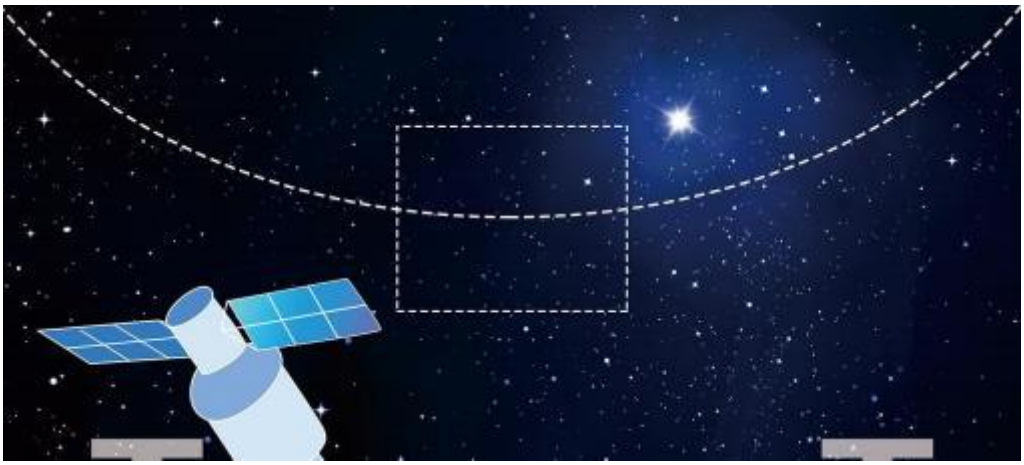
F. The programming remote control is placed in the dashed box below the starting point.



G. Laboratory module position: inside the T-shaped white area at the top of the field, arranged in a T-shape.

Docking Module Placement Example Diagram

H. Orbit position as shown (dimensions 20cm * 25cm).



Orbit Position Example Diagram

2. Equipment Requirements

A. Participating equipment is uniformly provided by the organizing committee.

B. Programming Module List.

图示	数量	图示	数量	图示	数量
	2		2		1
	2		2		1
	1				

C. Competition Robot Model and Laboratory Module Model.

3. Competition Rules

A. Before the competition starts, the robot equipment and remote control must be powered on, ensuring the devices are in a Bluetooth-connected state. The same set of programming modules is used for the entire competition. After the first scene ends, participants adjust the module usage themselves and enter the second scene.

B. The competition consists of two rounds. Participating teams take turns to compete according to the call order, with a break between rounds.

C. Each round has a total time of 180 seconds. After the team completes their pre-competition preparations on the field, they signal the referee. The referee counts down 3, 2, 1, blows the whistle, and the competition timing starts.

D. First, draw the route combination card. Based on the drawn route card, determine the collection route. Manually adjust the robot's position and orientation at Start Point 1 or Start Point 2. Then, use the screen-less programming robot and programming modules to write the program for the complete route at once and start it.

E. After starting the program, do not touch the robot. The task of collecting the target objects must be completed in one go. There is no limit on the number of programming attempts. If a route error is found, you may request the referee at any time to manually pick up the robot, return it to the start, and reprogram it. Timing does not stop. Continue until the task of collecting two items according to the drawn route is completed and the preparation area is reached.

F. Collecting one material scores 20 points, collecting two materials scores a total of 40 points. Reaching the preparation area scores 20 points.

G. Upon reaching the preparation area of the first scene, the participating team moves the robot themselves to the starting area of the second scene. Timing does not stop during this process.

H. After switching to the second scene, the team must change the program modules. Use somatosensory control to operate the robot, starting from the starting area of the second scene, and proceed to the space station to complete the laboratory module docking. Each successful docking scores 40 points, two successful dockings score 80 points.

I. Criteria for judging successful collection and successful docking: All four magnetic suction heads are successfully attached.

J. After completing the docking of two laboratory modules, the team continues to control the robot until the robot's vertical projection completely enters the dashed box of the orbit. This scores 60 points.

K. When the robot's vertical projection completely enters the dashed box of the orbit, the team raises their hand to signal the referee. The referee stops the timer and records the competition time used. The total time must not exceed 180 seconds. If time ends, the referee stops the competition and records the score for completed tasks.

L. During the programming phase, if the robot deviates due to equipment steering angle issues, it does not affect the competition score; time used is recorded normally. If equipment problems (other than steering angle) affect the competition score, the referee has the right to stop the team's current round and arrange for them to restart at the end of the current round's order. If the team is the last one, they can simply restart directly. The next round proceeds normally.

M. Observe competition etiquette. Treat all participating teams amicably and respect the referees' decisions. Serious arguments, fights, or other misconduct may result in disqualification.

4. Scoring Criteria

A. Remaining Time Score: The remaining time score accounts for 10% of the total score. The remaining time value is taken in seconds.

B. Remaining Time Score = (Remaining Time (seconds) ÷ Total Time (180 seconds)) × 20 (10% of total score).

C. Single Round Score: Item Collection Score + Preparation Area Arrival Score + Laboratory Module Docking Score + Return to Orbit Score + Remaining Time Score.

D. Competition Ranking:

a) Ranking is based on the best result from the 2 rounds.

b) If scores are tied, the remaining time corresponding to the highest score is considered; the team with more remaining time gets a higher rank.

c) If the highest score and corresponding remaining time are tied, ranking is based on the second-highest score and its corresponding remaining time.

E. **Score Table:**

Judge Item	Value	Points	Score
1. Material Collection	0 1 2	20	
2. Arrival at Preparation Area	0 1 (N) (Y)	20	
3. Successful Lab Module Docking	0 1 2	40	
4. Return to Orbit	0 1 (N) (Y)	60	
5. Remaining Time Score	(Remaining Time (s) ÷ Total Time (s)) × 20		
	Total Score		
	Remaining Time		