NRC RoboCup Singapore Challenge 2025 – CoSpace Autonomous Driving Category

Age Group: Primary | Secondary | Junior College (JC)

Team Size: 1 – 3 students

Software: CoSpace Auto-Driving/Auto-Delivery Simulator

Hardware: VRBOT-C6

Challenge Theme: Smart Transportation

This challenge aims to bring together students with basic robotics and coding skills who are interested in solving real-world problems through technology. By participating in the NRC RoboCup Singapore Challenge, students will build a strong foundation in robotics & AI and gain the confidence to advance to regional events such as the RoboCup Asia-Pacific (RCAP) competitions.

Additional Recognition:

Students demonstrating proficiency based on the RoboCup Singapore Education Framework will also receive official Certificates of Recognition.

Moving forward:

Winning teams will have an opportunity to take part in the RoboCup Asia-Pacific finals in Abu Dhabi, 10 - 14 Nov 2025.

Below are the details for different age groups.

PRIMARY LEVEL

The CoSpace Autonomous Driving Challenge focuses on path planning in a smart city. For this challenge, teams are required to program autonomous vehicles to navigate through a smart city in both real and virtual environments (CoSpace). Tasks involve line tracking, obstacle avoidance, colour detection using RGB sensor, and path planning.

Challenges:

Participants in this age group may choose to compete in the Virtual Robot Challenge only or take part in both the Virtual and Real Robot Challenges. Virtual Robot Challenge is compulsory.

If your team decides to participate in both the virtual and real challenges, it is advisable to have at least two students per team.

1. Virtual Robot Challenge
    - Simulator: RCAP CoSpace Auto-Driving, U12
    - Rules: [PDF] [Video]
2. Real Robot Challenge
    - Simulator: RCAP CoSpace Auto-Driving, U12
    - Hardware: VRBOT-C6 (Teams must bring their own hardware)
    - Rules: [PDF] [Video]

Awards:

- Virtual Robot Challenge Award
- Real Robot Challenge Award
- Grand Challenge Award: Awarded based on the combined scores of both virtual and real robot challenges.

SECONDARY LEVEL

The CoSpace Autonomous Driving Challenge focuses on path planning in a smart city. For this challenge, teams are required to program autonomous vehicles to navigate through a smart city in both real and virtual environments (CoSpace). Tasks involve line tracking, obstacle avoidance, colour detection using RGB sensor, Gyro sensor and path planning.

Challenges:

Participants in this age group may choose to compete in the Virtual Robot Challenge only or take part in both the Virtual and Real Robot Challenges. Virtual Robot Challenge is compulsory.

If your team decides to participate in both the virtual and real challenges, it is advisable to have at least two students per team.

1. Virtual Robot Challenge
    - Simulator: RCAP CoSpace Auto-Driving, U19
    - Rules: [PDF] [Video]
2. Real Robot Challenge
    - Simulator: RCAP CoSpace Auto-Driving, U19
    - Hardware: VRBOT-C6 (Teams must bring their own hardware)
    - Rules: [PDF] [Video]

Awards:

- Virtual Robot Challenge Award
- Real Robot Challenge Award
- Grand Challenge Award: Awarded based on the combined scores of both virtual and real robot challenges.

JUNIOR COLLEGE (JC) LEVEL

In this challenge, teams are required to develop and program effective strategies for a virtual robot operating within an Intelligent Transportation System (ITS) environment provided by the CoSpace platform. In simulated last-mile delivery and smart city scenarios, the robot must efficiently deliver parcels from the Distribution Centre to the Collection Station.

Platform & Rules:

- Simulator: RCAP CoSpace Auto-Delivery U19
- Rules: [PDF] [Video]

Awards:

- Virtual Robot Challenge Award

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