Simulator Test Technical Report Instruction

I. Requirement

1. Document in PDF format, including all text (both Chinese and English) and pictures.

2. The main text should be written in small four-point song type (Chines) or Times New Roman (English).

3. No more than 10 pages of A4 paper.

4. Named as school name + team name + RMUS technical report.

II. Description of the main content

Teams need to elaborate on two aspects: the technical solutions in the **Simulator Test stage (60%)** and in the **Sim2Real Test stage (40%)**:

2.1 Simulator Test (60%):

Teams need to elaborate on the **auto-detection, positioning, motion planning, and intelligent decision-making** algorithms used in the Simulator Test stage and point out the performance of the algorithms. Including but not limited to the following:

- Auto-detection:
  - ➢ Describe the sensors and corresponding algorithms used, and explain the advantages of the algorithms from the aspects of recognition of different numbers, etc.
  - ➢ Point out the performance of the algorithm, such as the accuracy of target recognition, frame rate, distance accuracy, etc.

- Positioning：
  - ➢ Describe the sensors and corresponding algorithms used, and elaborate the advantages of the algorithms from the aspects of random initial positioning and high-speed motion positioning.
  - ➢ Point out the performance of the algorithm, such as positioning accuracy, frame rate, etc.

- Motion planning：
  - ➢ Describe the adopted obstacle avoidance sensors and corresponding algorithms, and introduce the used algorithms and their advantages from the aspects of path planning, etc.

- > Point out the performance of the algorithm, such as the frequency of planning, the maximum speed of movement, the ability to avoid obstacles, etc.
- Decision making:
  - > If the traditional method (such as finite state machine or behavior tree) is adopted, the operation logic block diagram should be drawn; if the learning scheme is adopted, the algorithm, network architecture, and learning framework used for reference should be pointed out.

2.2 Sim2Real Test (40%):

The team members need to briefly introduce the **auto-detection, positioning, motion planning, and intelligent decision-making algorithms** to be used in the Sim2Real Test stage and elaborate on how to eliminate various deviations (visual deviation and system dynamics deviation, etc.) between the real environment and the simulated environment. Including but not limited to the following:

- Auto-detection:
  - > Describe how to eliminate the influence of the Sim2Real visual gap on recognition accuracy, etc.

- Positioning：
  - > Describe how to eliminate the influence of the Sim2Real sensor gap on location accuracy, etc.

- Motion planning：
  - > Describe how to achieve high-quality motion planning in the presence of identification and positioning biases.

- Decision-making:
  - > Describe how to achieve more robust decision-making in the presence of identification and positioning biases.