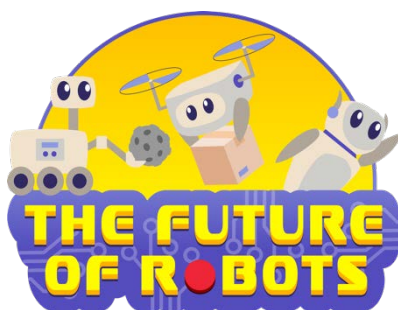# RoboMission
Senior Game Rules
Season 2025

The Future of Robots
Rocket Assembly

Official Game Rules for the WRO International Final. Version: January 15th 2025
(Note: Rules for local WRO events may vary!)

WRO International Premium Partner

WRO International Gold Partners

Table of Contents

Important information for reading this document:

- The general rules have changed drastically for 2025. Make sure to read them entirely.

- These game rules are made for local and national competitions.

- National Organizers in WRO countries are allowed to simplify the missions.

- For the International Final, one extra mission will be released on October 8th 2025. The extra challenge will work with the same game mat and brick set. It is not mandatory to do this extra mission to participate in the event.

- Because of possible surprise rules and the extra mission for the International Final, the game field may contain areas and markings that are not used at local or national events.

- For greater clarity, the robot missions are explained in multiple sections. But the teams can decide which missions they will do and which order.

- The game missions have easy and more complicated tasks. This makes the competition suitable for beginning and more experience teams. It is not necessary to solve all missions to enjoy a WRO participation.

- General information on game table setup and fixing of game objects on the field you find in the WRO RoboMission General Rules, chapter 7.

We wish everyone much success and a lot of fun with our WRO 2025 challenges!

Your team of World Robot Olympiad Association

1. Introduction

Launching rockets into space is crucial for advancing society by enabling scientific exploration, satellite deployment, global communications, and the development of new technologies. It allows humanity to better understand the universe, monitor Earth's environment, and improve global connectivity. Building and assembling rockets requires extreme precision, as even minor errors in design or construction can lead to catastrophic failures. Every component must be accurately aligned, from the fuel systems to navigation controls, to ensure a successful launch. Robots play a vital role in this process, supporting tasks such as welding, drilling, and assembling intricate parts with unparalleled accuracy and consistency, reducing human error, and speeding up the manufacturing process. This automation ensures higher quality, safety, and efficiency in rocket assembly.

Can your robot help assembling the rocket and make it ready for a space launch?

2. Game Field

The following graphic shows the game field with the different areas.
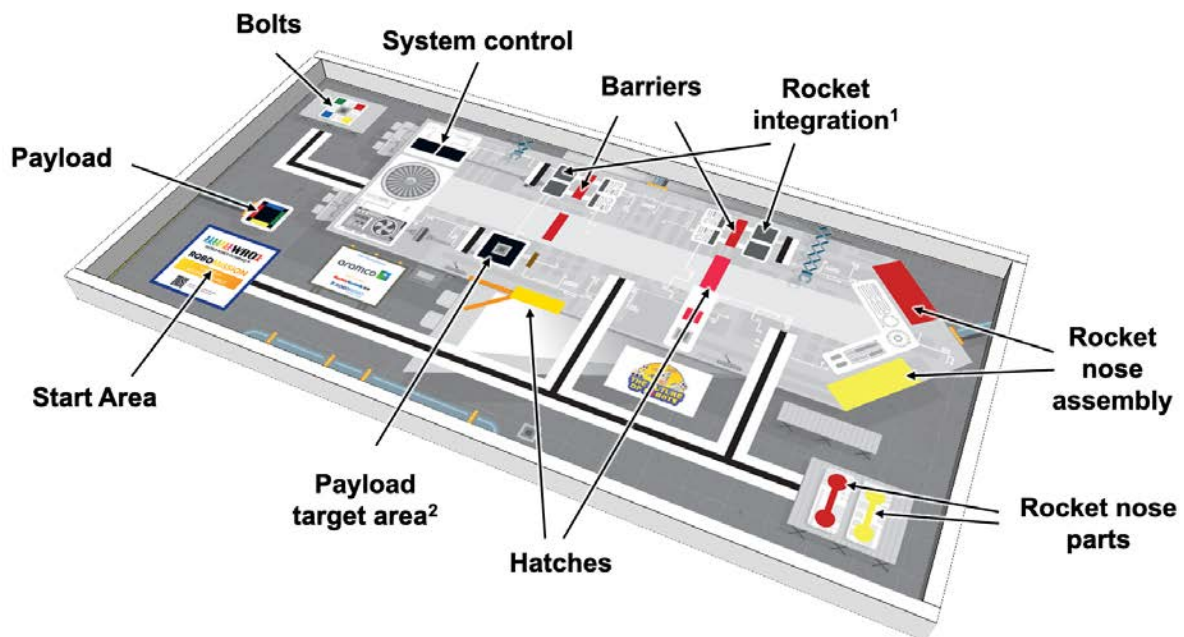
1) Rocket integration: Positions of corresponding marking blocks are on the other side of the barriers.

2) Payload target area: Position of marking block is on the right side next to the target area.

If the table is larger than the game mat, place the mat against the wall with the two sides closer to the start area (in the picture: left and bottom side).
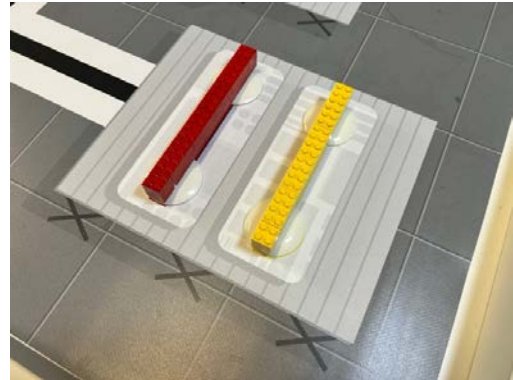
3. Game Objects, Positioning, Randomization

Rocket nose parts

There are **2 rocket nose parts (1x red, 1x yellow)** on the field. The position on the game field is in the bottom right corner.
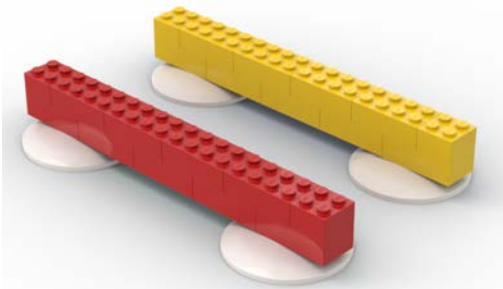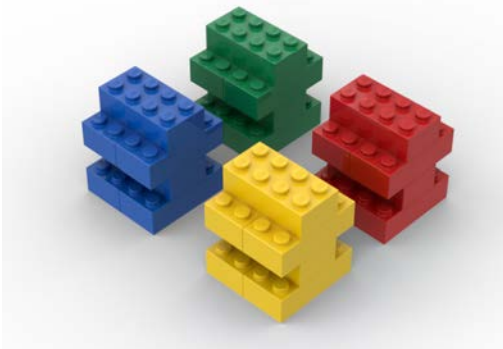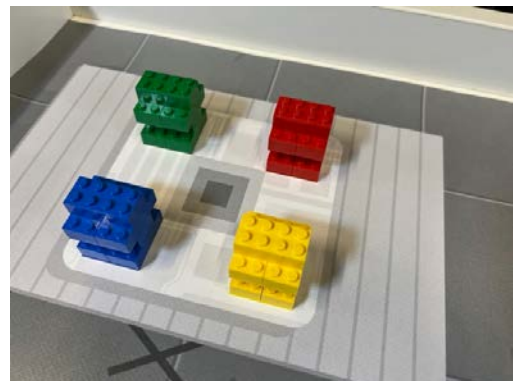

Rocket nose parts	Position on the field

Bolts and marking blocks for rocket integration

There are **4 bolts (1x green, 1x blue, 1x yellow, 1x red)** on the field. The position on the game field is in the top left corner on the coloured squares.
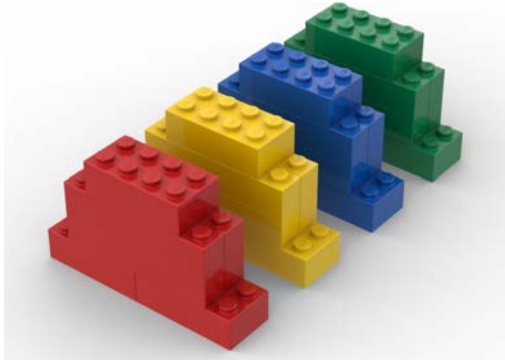

Bolts	Position on the field

There are **4 marking blocks (1x green, 1x blue, 1x yellow, 1x red)** on the field. The positions are grey rectangles on the upper end of the field next to the barriers. Which colour fills which position is randomized.

Marking blocks

All 4 marking blocks are always on the game field. The positions are randomized. The following pictures show one potential randomization.
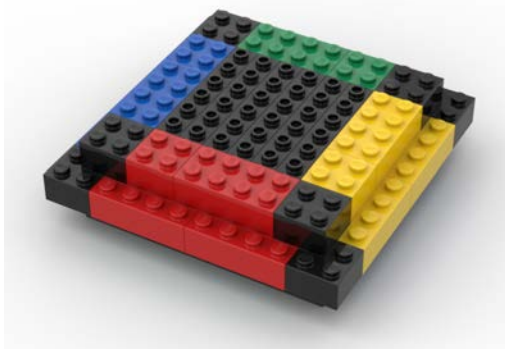

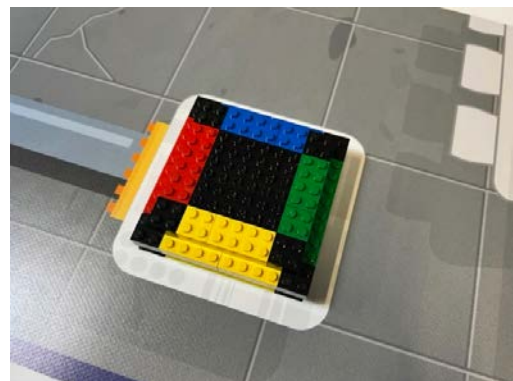2 marking blocks are placed on the right side of the left barrier

2 marking blocks are placed on the left side of the right barrier

Payload with marking block

There is **1 payload** on the field. The position on the game field is directly next to the starting area. The orientation of the payload is marked on the game field.
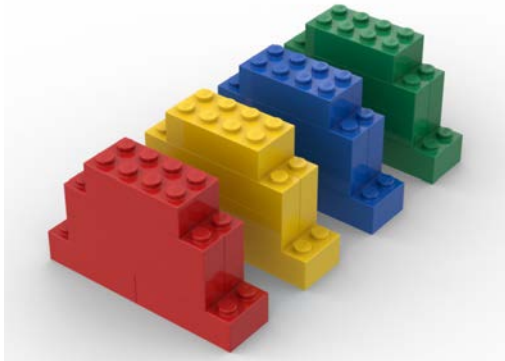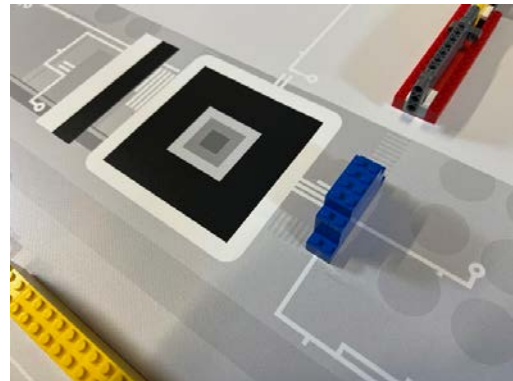

Payload

Position on the field

There are **4 additional marking blocks (1x green, 1x blue, 1x yellow, 1x red)** but only one is chosen randomly and placed on the field. The position is the brown rectangle next to the payload target area.


|	
Marking blocks	One marking block is placed next to the payload target area.

System control

There is **1 system control** on the field. The position is marked by two black rectangles at the left end of the rocket. The system console is fixed on the game field with double-sided adhesive tape. The white flag on the left pole points to the left. The red flag on the right pole points downwards / to the back.

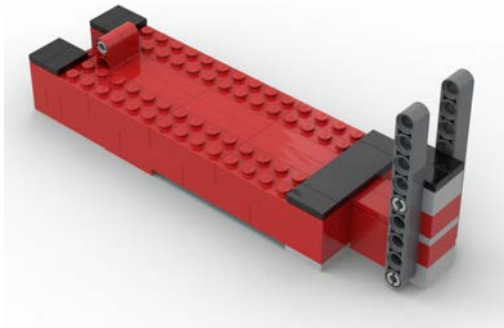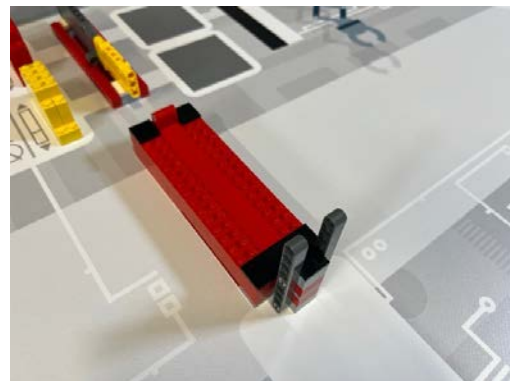|	
System control	Position on the field
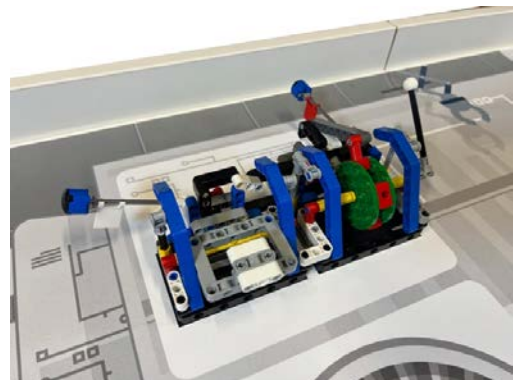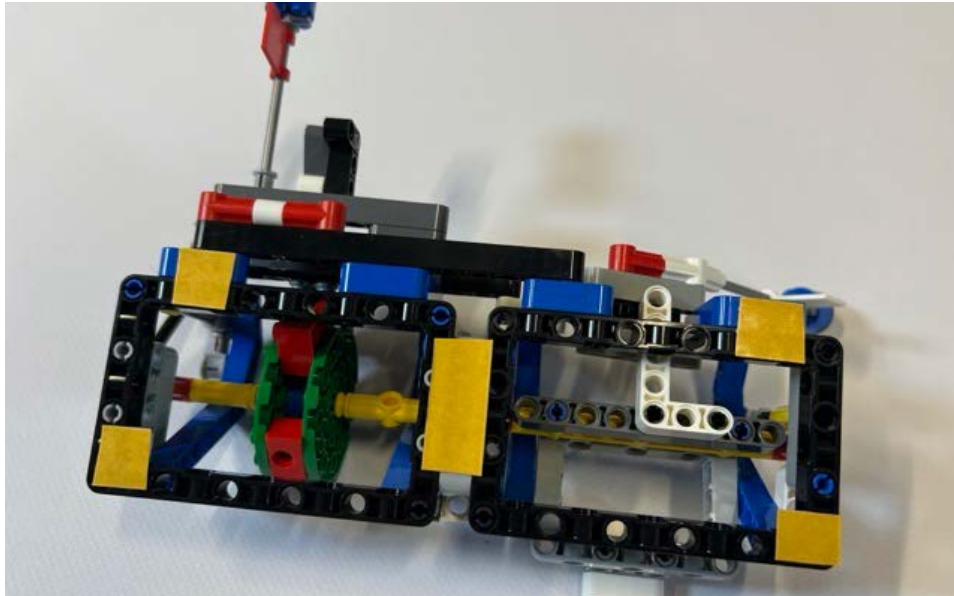
Recommended positions of double-sided adhesive tape.
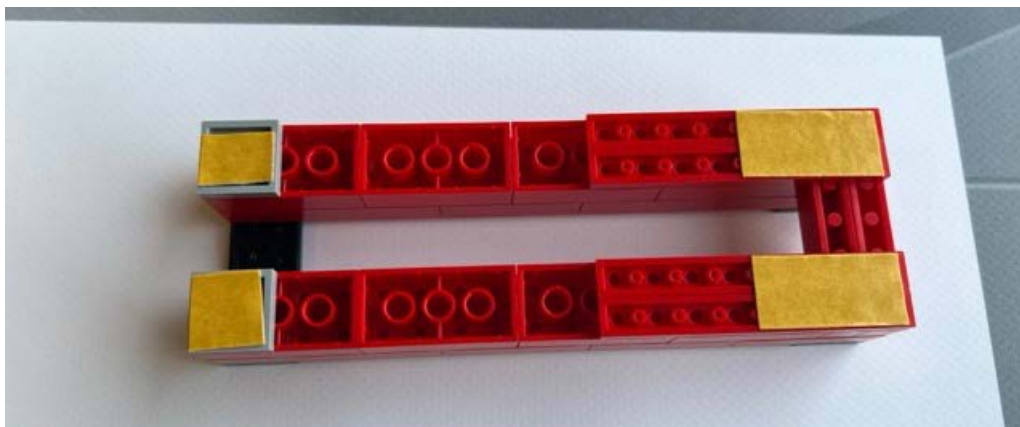(the system control is upside down)

Hatches

There are **2 hatches (1x yellow, 1x red)** on the field. The positions are marked in red and orange. The hatches are fixed on playing field with double-sided adhesive tape.
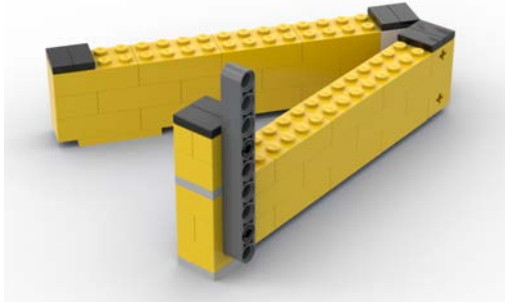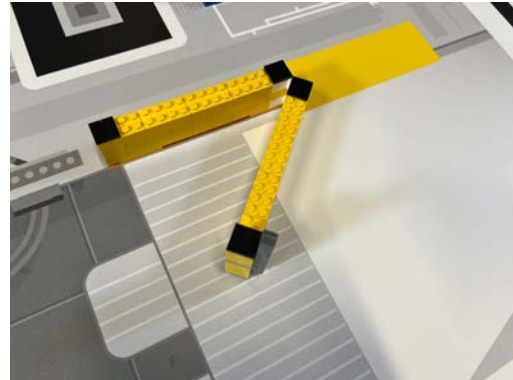

Red hatch (sliding)

Position on the field

Recommended positions of double-sided adhesive tape.

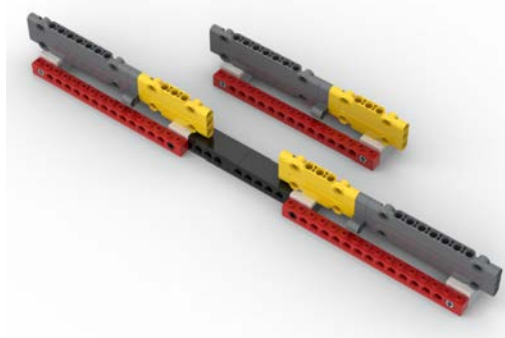| Yellow hatch (swinging) | Position on the field |

Recommended positions of double-sided adhesive tape. It is recommended to add additional double-sided adhesive tape between game mat and game table below the yellow hatch.
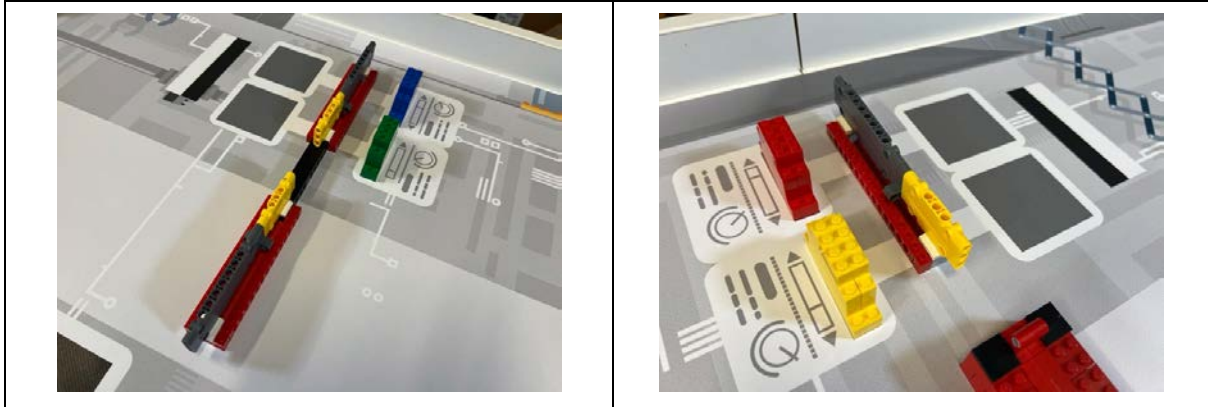
Barriers

There are **2 barriers (1x short, 1x long)** on the field. The positions are marked with red rectangles.

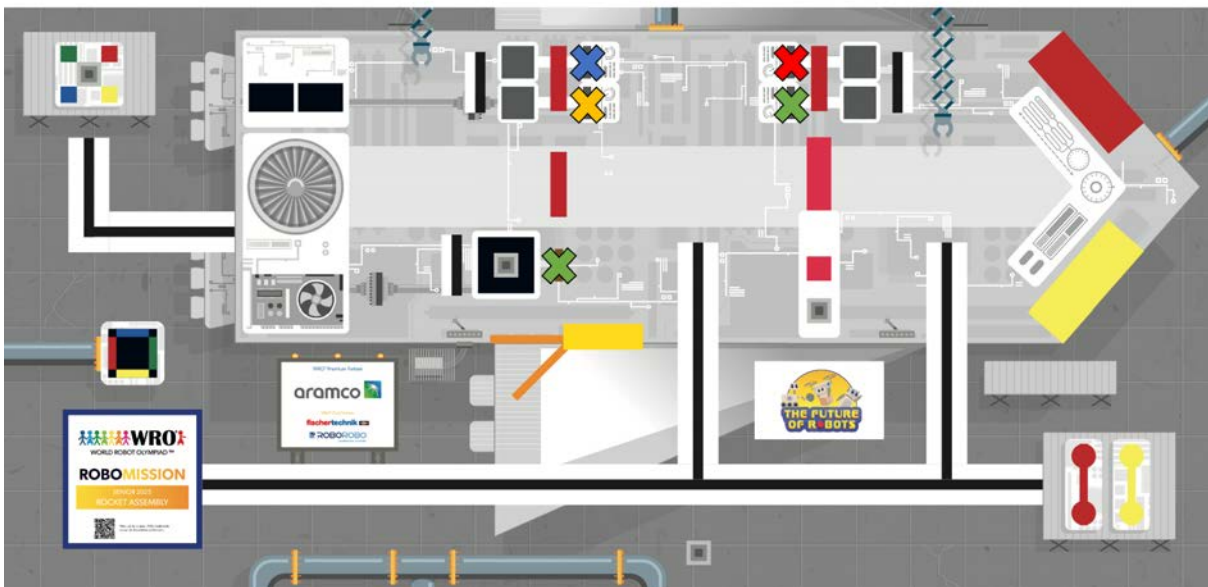| Barriers | *The flat sides of the panels on the barriers face inwards towards each other.* |

Summary randomization

On this field, the following objects are **randomly placed in <u>each round</u>**:

- 4 marking blocks for rocket integration
- 1 marking block for the payload integration

You can see one possible randomization here (only randomized objects are marked):

Robot Missions
3.1 Assemble the rocket nose

Two rocket nose parts are placed in the bottom right corner of the game field. The rocket nose can be assembled by bringing the two nose parts to the correct coloured areas. Full points are awarded if the parts are completely and upright in the correct coloured area.

- Definition "completely in": Completely means that the game object is touching the corresponding area only.

- Only one element scores points per target area.

	Each	Max.
The nose part is completely and upright in the <u>correct coloured</u> rocket nose target area.	**10**	**20**
The nose part is completely and upright in the <u>wrong-coloured</u> rocket nose target area.	5	

10 points (completely inside and in upright position)	0 points (partly outside of area)	0 points (partly is outside of area)
0 points (not in upright position)	5 points (fully in and upright, but wrong colour)	0 points (not upright)

3.2 Integrate rocket sections

The rocket is divided in three parts by the barriers. The matching bolts must be used to firmly connect the parts together. The marking blocks on the other side of the barriers show which bolt is needed.

- Definition "completely in": Completely means that the game object is touching the corresponding area only.

- Only one element scores points per target area.

- The white borders around the rocket integration areas are <u>not</u> part of the areas.
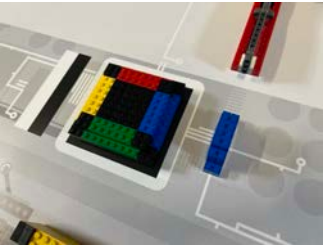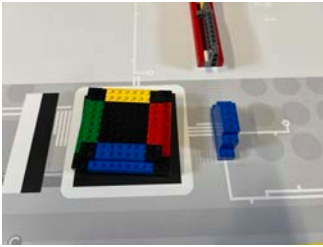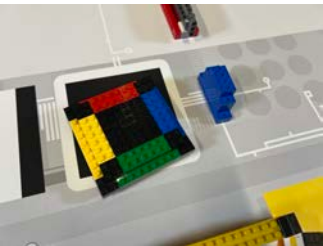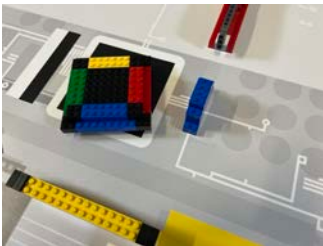
	Each	Max.
Bolt is completely in the rocket integration area <u>and</u> its colour is matching the colour of the corresponding marking block	**12**	**48**
Bolt is partly touching any rocket integration area <u>or</u> completely in but not matching the colour of the corresponding marking block	5	

12 points
(correct coloured bolt completely in area)

12 points
(Bolt does not have to be upright)

5 points
(bolt partly in area)

5 points
(completely in but wrong colour)

5 points
(partly in, wrong colour not relevant)

0 points
(bolt not touching target area)

3.3 Load the rocket

The job of a rocket is to transport cargo into space. Bring the payload into the rocket and make sure it is placed correctly.

- ▪ Definition "completely in": Completely means that the game object is touching the corresponding area only.

- ▪ The white border around the payload area is not part of the area.

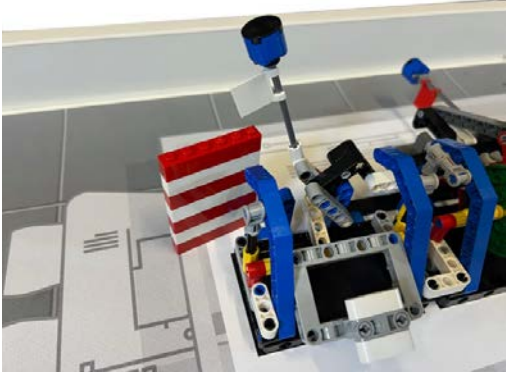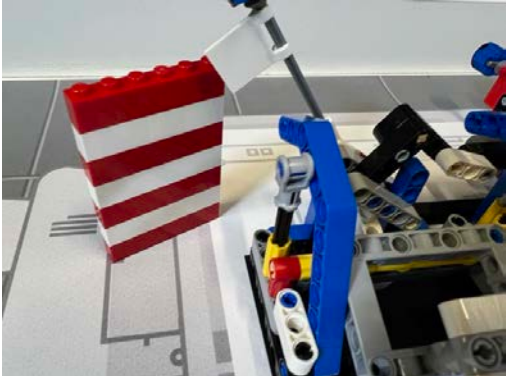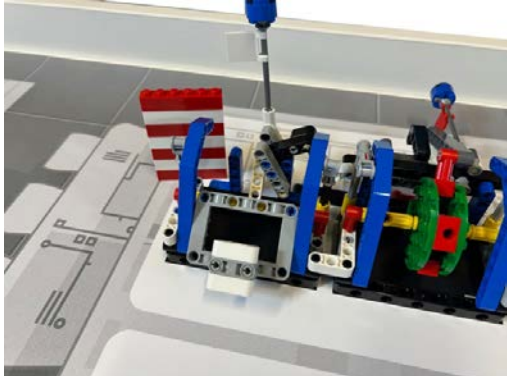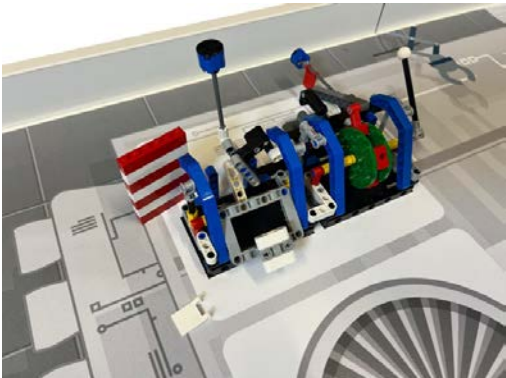|	Each	Max.
Payload is fully in the payload area and has the correct orientation	**28**	**28**
Payload is partly touching the payload area (no matter which orientation) or fully in but has the wrong orientation	14	

28 points (completely inside and correct orientation)	14 points (completely inside, but wrong orientation)	*Hint: The payload is correctly orientated if the side facing the marking block has the same colour as the marking block. Due to the size of the payload and the target area, a clear alignment can always be recognized when the payload is completely in the target area.*
14 points (only partly inside, orientation not relevant)	14 points (only partly inside, orientation not relevant)	0 points (not touching target area)
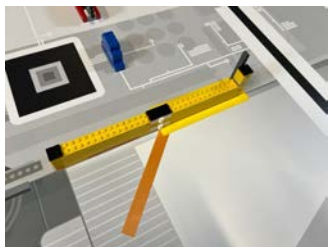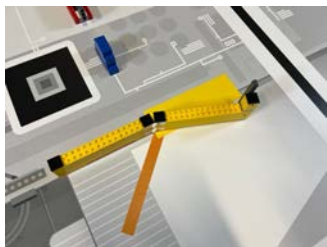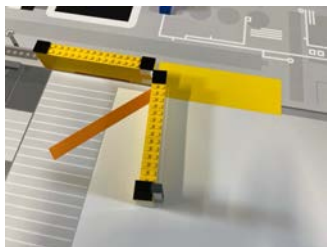
3.4 Check systems

Before a rocket can be launched, all systems must be tested. This test is carried out on the system console. The two operations on the system console are interlocked and must be operated in the correct order. The first operation is pushing down on the left side and the second operation is pulling the lever on the right side. The result is checked by the positions of the flags.

	Each	**Max.**
Flag in system console is in upright position	**15**	**30**

15 points
(flag is upright)

This block must be able to move freely under the flag in order to score points. If a flag has been twisted, it must be turned to its original orientation before the test.

0 points
(flag not high enough)

15 points
(flag is fully upright)

0 points
(no flag, no points)

3.5 Close the hatches

Two hatches are on the field. The yellow one is a swinging hatch. The red one is a sliding hatch. Both hatches score points when they are fully closed. The following table shows when hatches are considered closed.

	Each	Max.
Hatch is fully closed • Yellow: Swinging part is completely in yellow area • Red: Sliding part touches red rectangle	9	18

9 points (fully closed, completely in yellow area)	0 points (touching outside of yellow area)	0 points (touching outside of yellow area)
9 points (fully closed, touching red rectangle)	9 points (fully closed, touching a little bit is enough)	0 points (not reaching red rectangle)

3.6 Bonus for barriers

Working on a rocket requires absolute precision. It is therefore not permitted to move the two barriers. The playing field does not provide any tolerances for moving. Minimal shifts that may have been caused by imprecise positioning before the run, have to be counted in favour of the team in case of doubt. Final decision of this is with the judge.

- Definition "damaged": Any situation that means that the game object is not exactly like at the start of the run, e.g. a brick fell off.

- Definition "moved": The game object is considered as moved if a part of the game object is touching the mat outside of the red areas.

	Each	Max.
Barrier is not damaged or moved	7	14

7 points (barrier still on red area)	**0 points** (barrier moved)	**0 points** (barrier damaged)
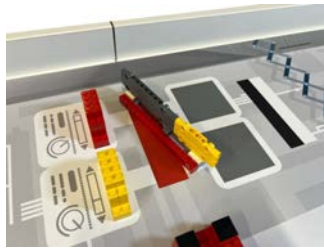
4. Scoring Sheet

Team name: _____   **Round: _____**

Tasks	Each	Max.	#	Total
Assemble the rocket nose				
The nose part is completely and upright in the <u>correct coloured</u> rocket nose target area.	**10**	**20**		
The nose part is completely and upright in the <u>wrong-coloured</u> rocket nose target area.	5			
Integrate rocket sections				
Bolt is completely in the rocket integration area <u>and</u> its colour is matching the colour of the corresponding marking block	**12**	**48**		
Bolt is partly touching any rocket integration area <u>or</u> completely in but not matching the colour of the corresponding marking block	5			
Load the rocket				
Payload is fully in the payload area <u>and</u> has the correct orientation	**28**	**28**		
Payload is partly touching the payload area (no matter which orientation) <u>or</u> fully in but has the wrong orientation	14			
Check systems				
Flag in system console is in upright position	**15**	**30**		
Close the hatches				
Hatch is fully closed • Yellow: Swinging part is completely in yellow area • Red: Sliding part touches red rectangle	**9**	**18**		
Bonus for barriers				
Barrier is not damaged or moved	**7**	**14**		
Maximum Score		**158**		
Total Score in this run				
Time in full seconds				