

レギュラーカテゴリー（エキスパート競技）高校生部門ルール

高校生部門は、世界大会への対応力を考慮し、英語版ルールで実施する。FAQに関しては、英語あるいは日本語で対応する。

参加チームへのアナウンス 2014 年 6 月 30 日

日本大会ルールについて【重要】

WRO Japan 競技 WG

【エキスパート競技】

WRO Japan レギュラーカテゴリー共通ルール、および高校生部門競技課題、国際大会順位付けを基本として競技会を開催する。WRO Japan2014 公式サイトよりルールを確認すること。

なお、英語版ルール（ロシア実行委員会作成）には不明瞭な箇所があるため、日本大会では以下のようにローカルルールを定める。

1. ソーラーパネルの設置： 競技開始前にセットされるソーラーパネルの状態は、動作、不動作、故障の3の場合のみとする。競技開始前には指定のエリアの中央に黒ラインにそって（平行方向）置かれているものとする。
2. 交換した故障パネルをステーション内倉庫に運び込むミッションに関しては、グレーゾーンにソーラーパネルが完全に入っている状態でポイントとする。ただし、はじめの状態のようにラインに整列してソーラーパネルを置く必要はない。
3. 2の場合で、故障パネルの（上下、倒れた状態等）置かれ方は特に問わない。
4. ソーラーパネルの入れ替え（不動作から動作、故障パネルの入れ替え）において、ひとつのエリアに2つ以上のパネルを置くことはできない。2枚以上おかれた場合は、そのエリアのポイントは成立しない。
5. ソーラーパネルは上下があり、ボッチのついている方を上側とする。
6. 9枚の動作ソーラーパネルが指定の場所におかれている場合のみボーナスポイントが成立する。（確認）
7. 宇宙ステーションと大気圏との移動では、かならずゲート（坂道）を利用して移動し、ロボット本体が完全にゲートを通過すること。（確認）
8. 各ラウンドのポイントは競技終了時あるいはリタイア時点の各状況をもとにポイントを決定する。
9. 宇宙ステーション倉庫内の交換用ソーラーパネルは、大気圏側が青色になるように黒ラインに沿っておかれているものとする。
10. 動作ソーラーパネルならび故障パネルなどを、競技中にそれらの形を変えた場合（ブロックが外れるなど）はその該当するパネルに関するミッションのポイントは認めない。

- 1 1. WRO Japan レギュラーカテゴリー 共通ルール 8 の 18) に準じて Base エリアでの静止ポイントを決定する。
以下、共通ルール 8 の 18)
18) ベースエリアなどでロボットが静止するとは、ロボット全体が壁などに触れずに 3 秒間留まることを意味する。壁にふれている場合は静止と認められず、タイムポイントは成立しない。

Space Station

Prelude

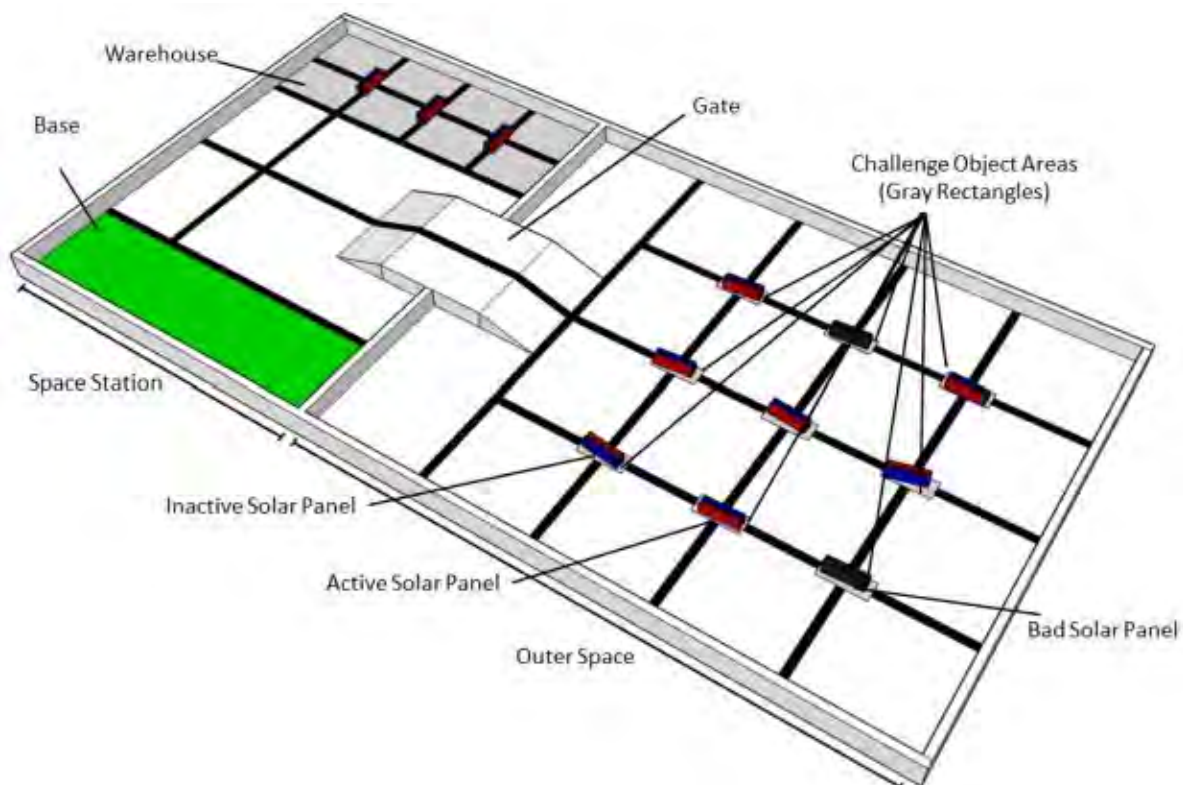


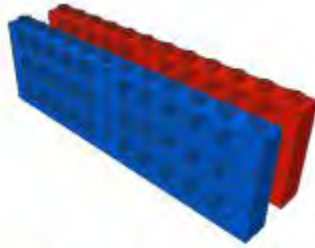
Yuri Gagarin is the first cosmonaut. He is the first human who visited outer space on the spacecraft Vostok 1 on April 12, 1961. The flight took just 108 minutes: the craft had limited amount of resources to sustain life. After that scientist and engineers from entire world started thinking of solution how to allow space stations to stay longer on the Earth orbit.

The most important thing every spacecraft needs to be equipped by is energy. Energy is used to power all electronic hardware on the board, to illuminate the spacecraft and to regenerate air and water for the space crew. There are several possible ways to get energy on a space station. One is big fields of solar panels around the station, another is to include a special module containing nuclear power plant. In both cases it is important to maintain this equipment otherwise absence of energy is the threat of life safety on the space station.

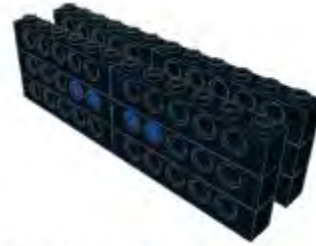
Challenge Overview

The robot begins in the Base area. The robot will have to pass through the Gate into Outer Space, check for bad Solar Panels (black color) and replace them with good ones from the Warehouse in the Space Station. The robot also needs to discover and activate inactive Colored Solar Panels. The robot must return in the Base zone after completing the task.





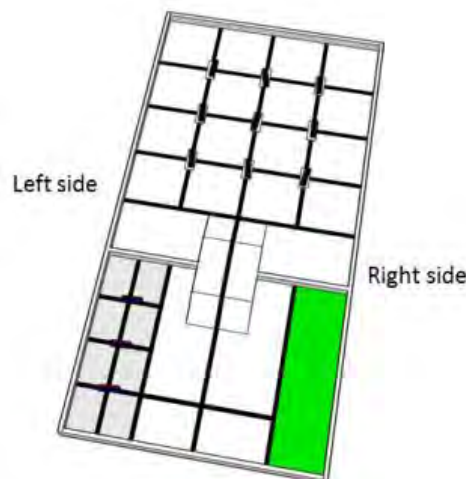
Colored Solar Panel represents electronic components in good conditions.



Bad Solar Panel represents faulty components.

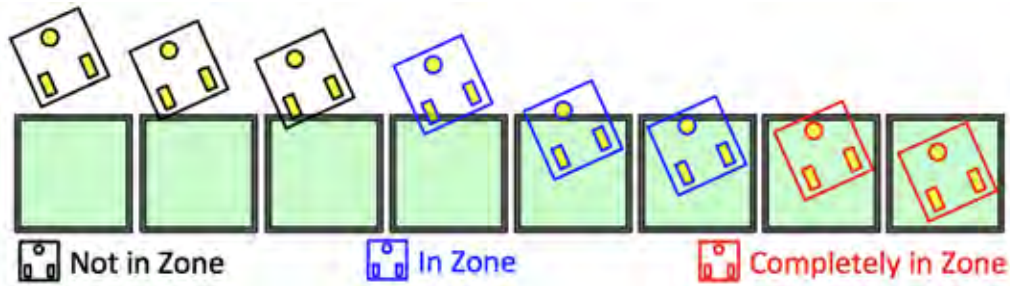
Rules & Regulation

1. The number of bad and inactive Panels is determined in the competition day before assembly time. In order to do this 5 Colored Solar Panels, 3 Bad Solar Panels and 3 Colored Solar Panels which represents inactive components ($5+3+3=11$ Panels in total) are put in a non-transparent box. After that two Panels are taken from the box one after another. The Panels remaining in the box will be used in all rounds during this competition day.
2. Before the round starts (post-quarantine) the Panels are taken from the box one after another and put to the Challenge Objects Areas (grey rectangles) on the field from left to right top-down. The Panels representing inactive components are set by their red side directed to the left side of the table, the active Panels are set by their blue side directed to the left side of the table. The positions of good and bad Solar Panels will be fixed for all participants in that particular round. This method to determine the Panels positions will be made for every round during the competition day.

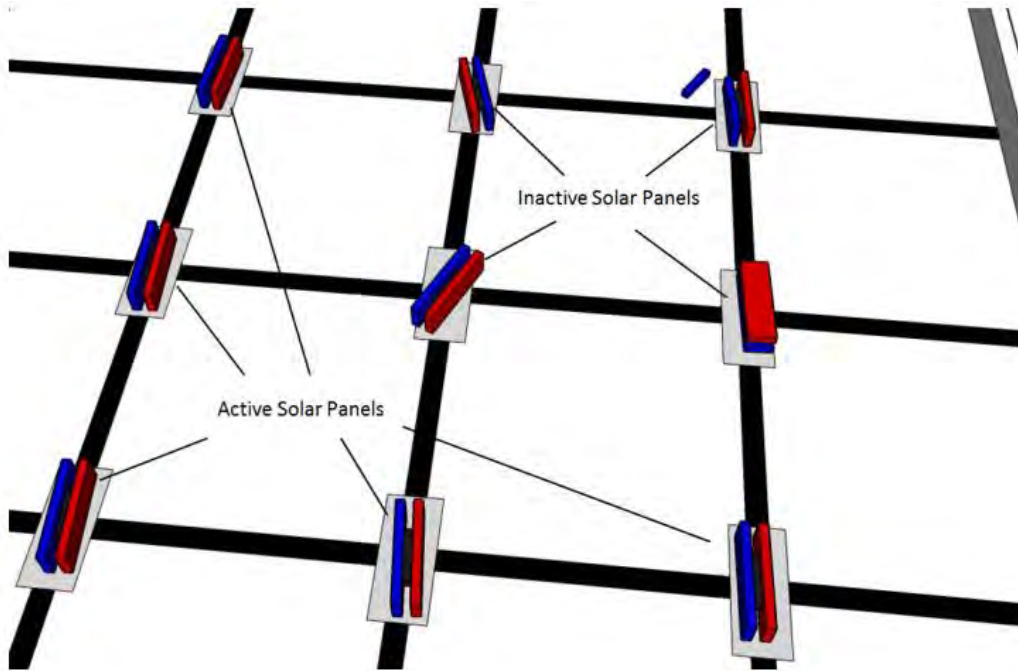


3. Multiple programs in the robot are allowed. For scoring rounds, the participants are only allowed to choose a program and press the enter button to run it. Participants are not allowed to make any additional input or setting to the chosen program.
4. The robot begins in the Base area (green zone) and finishes in the same area.

5. The robot must start within the Base area. The robot must be placed completely in the Base area.



6. The robot must switch on inactive Solar Panels - perform a 180-degree turn. A Panel must be completely in the Grey Square area after this operation.
7. The robot must discover and replace faulty Solar Panels by the good Solar Panels from the Warehouse.
8. The replaced bad Solar Panels must be transported to the Space Station area or to the Warehouse area.
9. The robot is not allowed to throw the Panels over the barrier delimiting the Space Station from the Outer Space area. Such kind of Panels are not considered in the final scoring.
10. Scoring for the bad Solar Panels transportation to the Space Station area or to the Warehouse area will be done only if the bad Solar Panels are completely in the corresponding zone.
11. The robot must use the Gate to move to the Outer Space area (or return to the Space Station area). The robot must be in the zone during the passing of the Gate. The robot is not allowed to climb over the barrier. Any part of robot can touch the barrier during the passing of the Gate.
12. All good Solar Panels must be completely in the corresponding Grey Squares areas. Only one Panel is allowed to be in every Grey Square area.
13. Additional points will be added if there is just nine active Solar Panels in the Outer Space area after the finish.
14. If the robot moves a good/activated Solar Panel from the zone or drops a Solar Panel during the movement even if it is completely in the zone, these Panels considered as inactive.
15. If a good/activated Solar Panel loses one or more LEGO-elements, this Panel considered as inactive.



16. The attempt and time will end if:

- The robot enters to the Base area (it is enough to be in the zone).
- Any team member touches any object on the field or the robot after the attempt starts.
- Challenge time (2 minutes) has ended.
- The participant call for "Stop" of the match.
- Violation of the rules and regulations herein.

Scoring

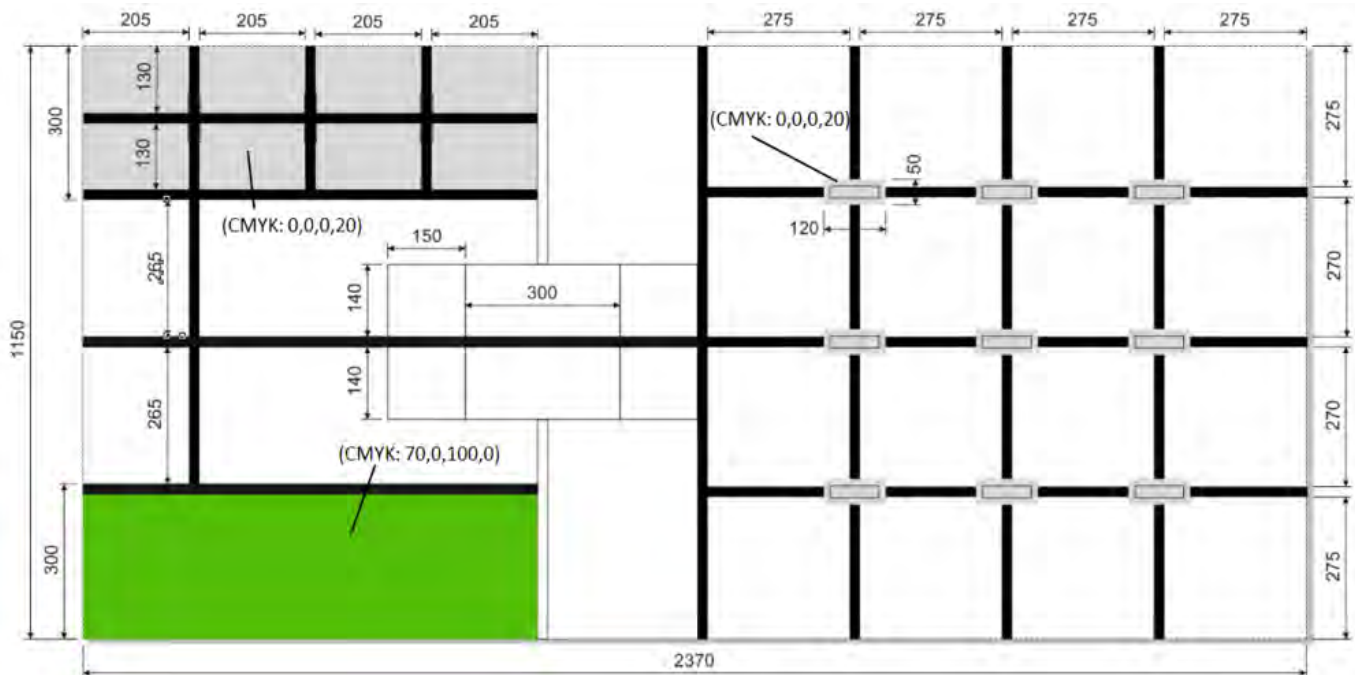
1. Score will only be calculated at the end of the challenge or when time stops.
2. A Solar Panel is activated (stay in vertical position, its red side is facing right and the blue side is facing left at the end of the challenge) and completely in the Grey Square area = 10 points per panel (90 points max).
3. To get the "Activate Solar Panel Score" (2) the robot must at least have activated one of the inactive panels in the Outer Space area
4. Transportation of a bad Solar Panel in the Space Station area (but not in the Warehouse area) = 10 points per panel.
5. Transportation of a bad Solar Panel in the Warehouse area = 30 points per panel.
6. Replacement of a bad Solar Panel with a good one picked up from the Warehouse area = 20 points per panel.
7. There are no other Solar Panels in the Outer Space area besides 9 activated Solar Panels = 20 points
8. The robot finishes in the Base area (after activating one of the inactive Solar Panel or replacing one of bad Solar Panels) = 10 points

9. Maximum score = 300 points.

Activated Solar Panels (90 points max)	Replaced bad Solar Panels (60 points max, depends on the draw)	Bad Solar Panels brought to the Space Station area (but not in the Warehouse area) (30 points max, depends on the draw)	Bad Solar Panels brought to the Warehouse area (90 points max, depends on the draw)	9 activated Solar Panels are in the Outer Space area	Finish in Base
10 points per panel	20 points per panel	10 points per panel	30 points per panel	20 points	10 points

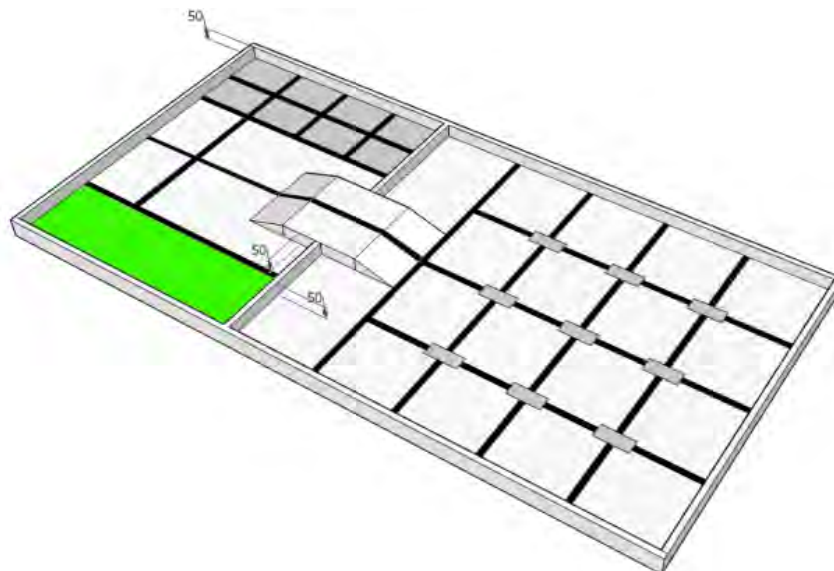
Table Specification

1. Horizontal Dimensions: 2370 mm × 1150 mm.

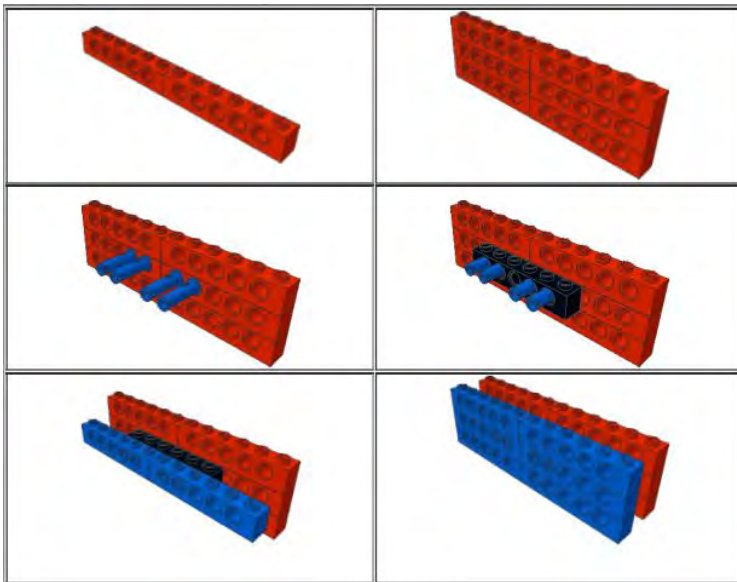


2. A wall that is 16 mm in width surrounds the table. The height of the wall is 50 mm.

3. The height of the barrier between the Space Station area and the Outer Space area is 50 mm.



4. The width of the black line in the playing field area is 20 mm \pm 1 mm.
5. The part of the Gate that is in the Space Station area is considered as part of Space Station, another part of the Gate is considered as a part of the Outer Space area.
6. The table base color is white, except for the black line, Challenge Object Areas, Warehouse, and the Base area.
7. There are 9 rectangles in the Outer Space area that are 120 mm x 50 mm.
8. Three intersections of the black lines in the Warehouse are the places where the good Solar Panels are set at the beginning of every attempt.
9. The good Solar Panels are set in the Warehouse as so their red sides are in the Outer Space area direction.
10. The error tolerance of the field is \pm 10 mm.
11. Building instructions for a good Solar Panel.



12. Building instruction for a bad Solar Panel.

