Annex
to the Regulations on the X International Festival of Robotics,
Programming and Innovative Technologies " RoboLand 2025"

REGULATIONS OF THE ROBOT COMPETITION
« ROBOLAND KAZAKHSTAN »

Age of students: 14-18 years .

Team: 2 people.

Robots: autonomous robots.

Equipment used: no restrictions.

Programming language: no restrictions.

Description of the task: This competition takes place on a testing ground symbolizing the map of Kazakhstan. The robot must pass 6 different tests (Karaganda, Ust-Kamenogorsk, Taldykorgan. Charyn Canyon, Baikonur, Aktau-Atyrau, Astana).

1. Requirements for the robot

1.1. The dimensions (width × length × height) of the robot at launch must not exceed 250×250×250 mm. Except for the Baikonur test site

1.2. The robot's weight is not limited.

1.3. The robot body must not damage the surface of the competition area in any way, otherwise the team may be removed from the competition and disqualified.

1.4. The competition is held only for autonomous robots.

1.5. The robot may change between tests.

2. Requirements for the landfill

2.1. The dimensions of the landfill are 15×12 m.

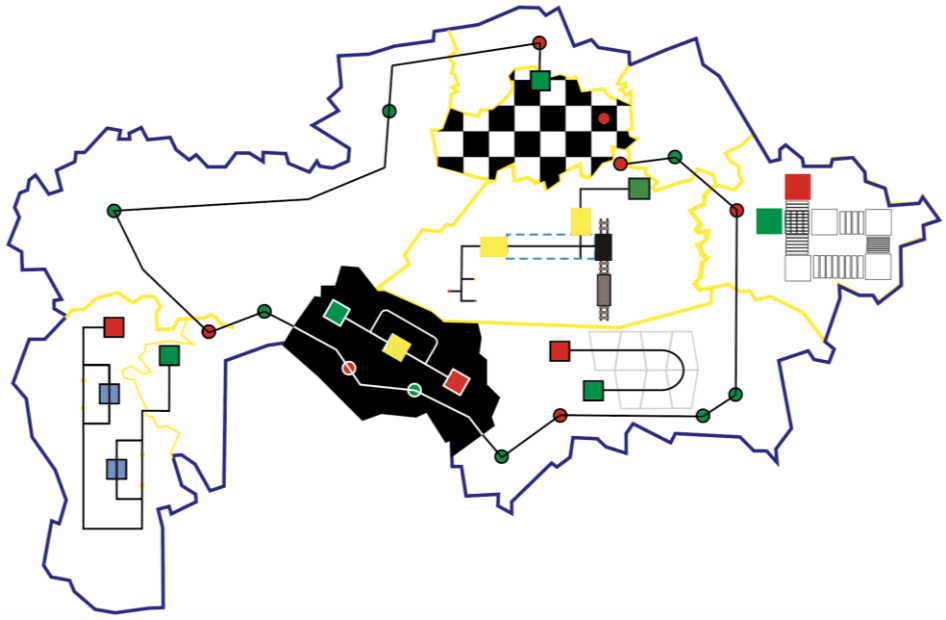
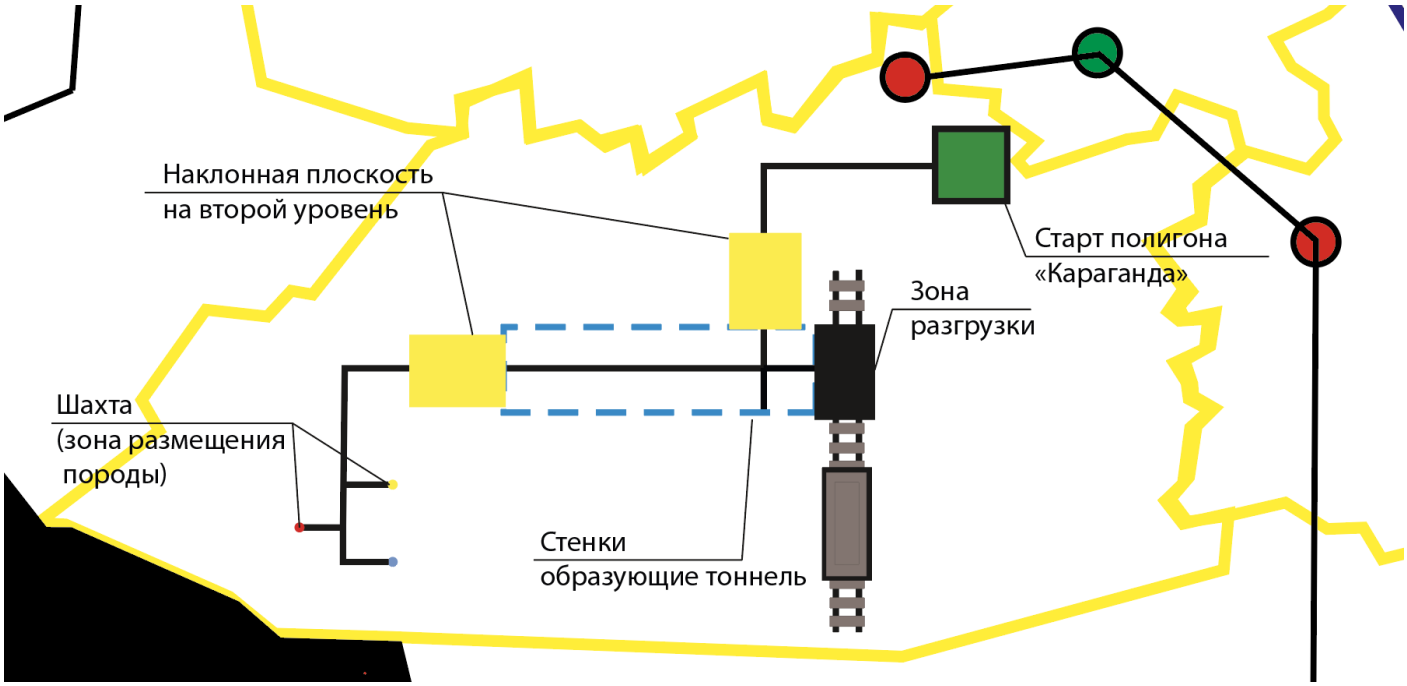


Fig. 1. **Sample map "ROBOLAND KAZAKHSTAN"**

2.2. *Polygon "Karaganda".*

2.2.1. The robot's task is to start moving from the green square and transport 3 loads of different colors from the rock placement area to the loading area.



Rice. 2. **Polygon "Karaganda"**

2.2.2. Polygon elements.

2.2.2.1. Weight – washers with a diameter of 40 mm, a height of 20 mm, red, blue and yellow. Approximate weight of a washer is 20 g.

2.2.2.2. The rock placement zone is a circle with a diameter of 40 mm.

2.2.2.3. Electric locomotive carriage.

2.2.2.4. Ascents and descents must not exceed 30 degrees.

2.2.2.5. The width of the tunnel for movement inside the landfill is 30 cm.

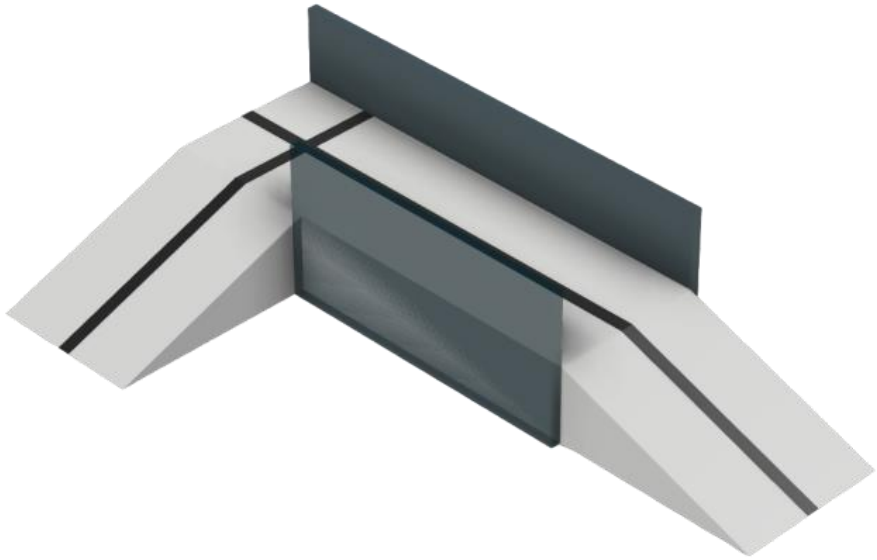


Fig. 3. **Sample of the “Mine” element of the “Karaganda” polygon**

2.2.3. Evaluation criteria.

Criterion	Points
Ascent to the second level (The robot's projection does not touch the 1st level of the polygon)	5
Ride to the first level (The robot's projection is completely located on the 1st level of the polygon)	5
Load offset (Load does not touch the placement area)	10×3
Transportation of cargo (Cargo is in a trolley)	20×3
Total	100

2.3. *Test "Ust-Kamenogorsk"*.

2.3.1. The robot's task is to overcome a network of moving bridges connected by observation platforms located at different heights from the start to the finish.

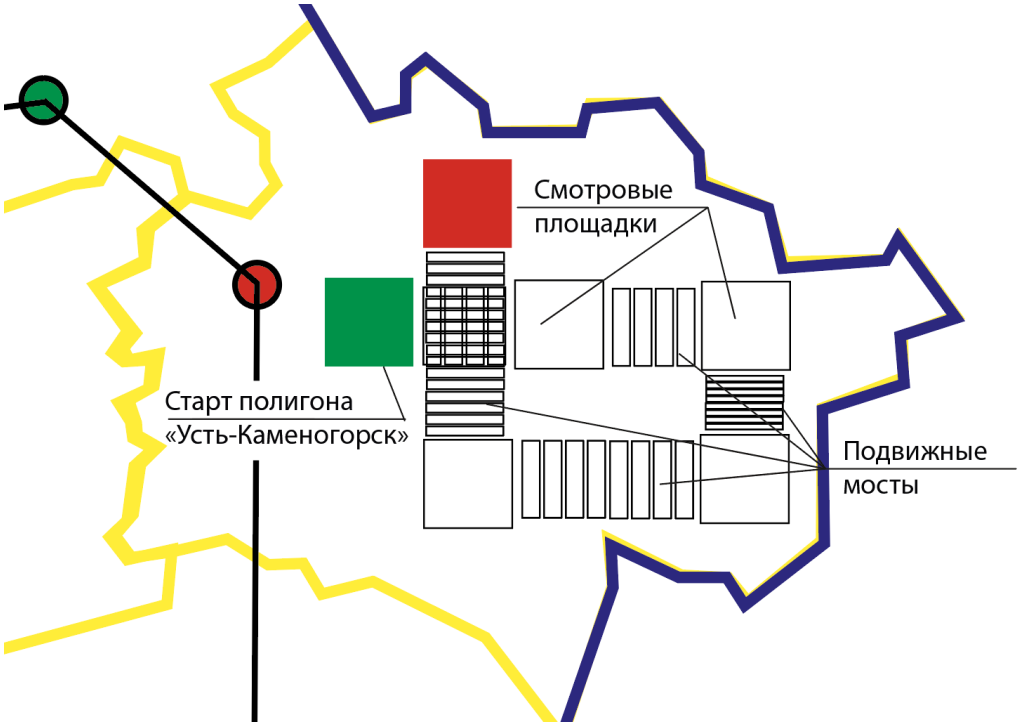


Fig. 4. **Ust-Kamenogorsk landfill**

2.3.2. Polygon elements.

2.3.2.1. The bridge consists of sections of different lengths and widths, connected to each other according to the rope bridge principle. The length of the bridges varies from 25 cm to 2.5 m.

2.3.2.2. Sections – plates 30×10×2 cm, 30×5×2 or 30×2×2 cm.

2.3.2.3. Observation platform – a shelf measuring 40 x 40 cm. The height is not regulated. The difference between two adjacent platforms cannot exceed 45 degrees.

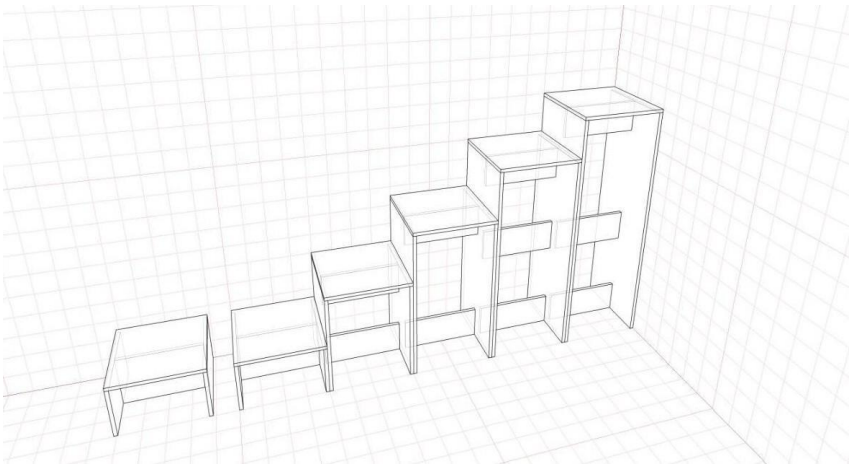


Fig. 4. **Sample of the elements of the "Observation Deck" of the "Ust-Kamenogorsk" training ground**

2.3.3. Evaluation criteria.

Criterion	Points
Passing the bridge (The robot is completely on the observation deck)	20×5
Total	100

2.4. *Test site "Taldykorgan" Charyn Canyon".*

2.4.1. The robot's task is to overcome a series of canyon steps. Start climbing from the green zone (start zone), climb to the upper platform of the canyon, and then descend to the red finish zone.

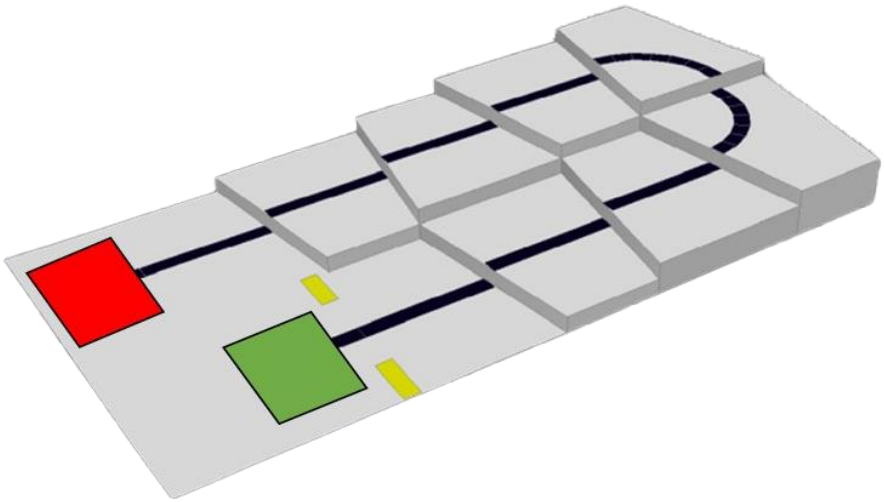


Fig. 5. **The Charyn Canyon test site**

2.4.2. Polygon elements.

2.4.2.1. Dimensions of the landfill: 1.2×2.5 m.

2.4.2.2. Steps are white with a black line 16-25 mm wide. Steps are located at an angle to the line of travel, but no more than 30 degrees to the perpendicular to the line of travel. Steps are 50 mm high and 600 mm wide.

2.4.3. Evaluation criteria.

Criterion	Points
Overcoming the step up (1, 2, 3 and 4 steps) (The robot projection is completely on a flat surface) In case of an unsuccessful attempt to overcome, the coefficient is 0.5	14×4
Overcoming the step down (5, 6, 7 and 8 steps) (The robot projection is completely on a flat surface. The robot has maintained a vertical position) In case of an unsuccessful attempt to overcome, the coefficient is 0.5	10×4
Finish (The robot stopped independently in the finish zone, the projection of the robot is completely in the zone)	4
Total	100

2.5. *Baikonur training ground.*

2.5.1. The robot's task is to start with the rocket, place it in the rocket launcher's placement zone and lift it using the mechanism located on the back side. And then finish. The robot moves along the white line.

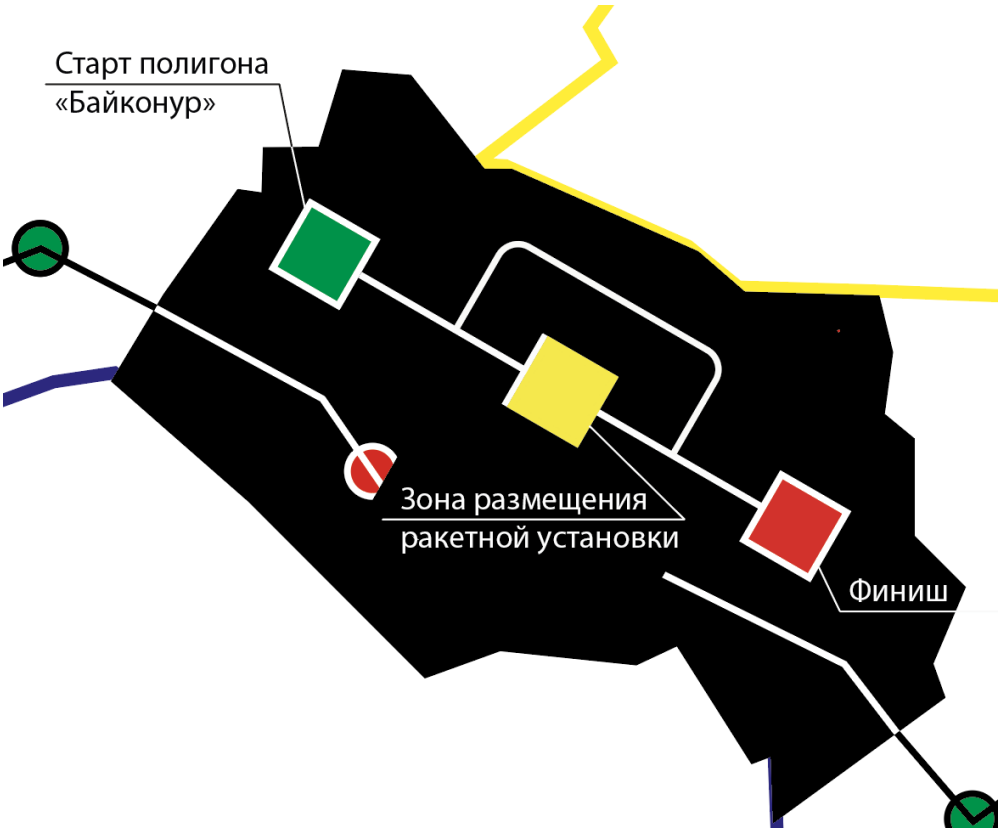


Fig. 6. **Baikonur testing ground**

2.5.2. Polygon elements.

2.5.2.1. Black field with markings for the installation of elements and white lines 16-25 mm.

2.5.2.2. Rocket. Element from the Lego Lunar Odyssey set. Article: LO2018. Rocket dimensions in the appendix.

Fig. 7. **Sample of the “Rocket” element (assembled) of the “Baikonur” test site**

2.5.2.3. Rocket launcher. Element from the Lego Lunar Odyssey set. Article: LO2018. Size: 250 mm x 250 mm. The rocket launcher is located near the rocket loading area, closer to the launch site.

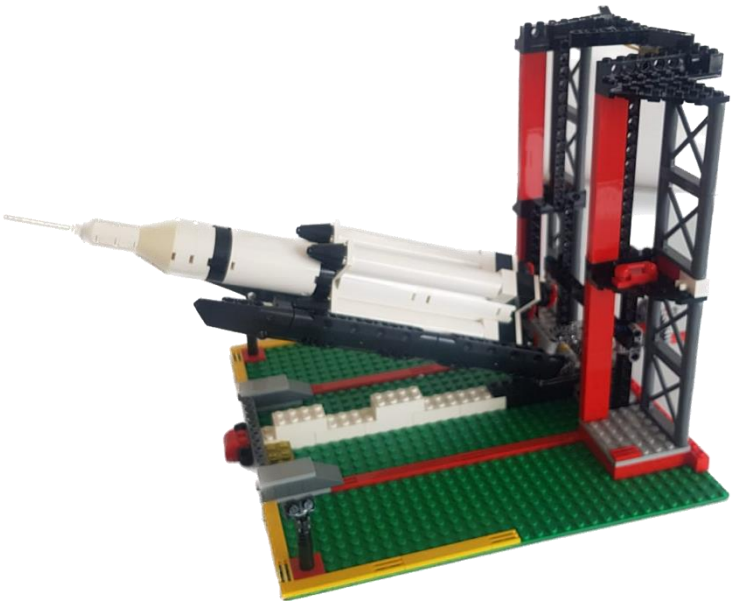


Fig. 8. **Sample of the “Rocket Launcher” element of the Baikonur test site**

2.5.2.4. Rocket Lifting Mechanism. Element from the Lego Lunar Odyssey set.

Article: LO2018. The robot must perform a rotational motion until the rocket takes a vertical position.

Fig. 9. **Sample of the "Rocket Launcher" element of the Baikonur test site**

Attention! There are NO robot size restrictions on this test site. The robot must launch together with the rocket. However, the participant can load the rocket into the rocket launcher independently. In this case, no points will be awarded for installing the rocket. If the robot tried to load the rocket, but the attempt was unsuccessful, it can restart the attempt and load the rocket independently. The remaining points are awarded according to the evaluation criteria.

2.5.3. Evaluation criteria.

Criterion	Points
The robot placed the rocket into the launcher. (No part of the rocket touches the test site)	50
The robot has begun to lift the rocket. The rocket is not in a horizontal position.	15
The rocket takes a vertical position	20
Finish (Robot touches the red square)	15
Total	100

2.6. *Test site "Aktau-Atyrau".*

2.6.1. The robot's task is to clear the area: distinguish buoys from oil barrels and deliver all barrels to the oil platform.

2.6.2. Polygon elements.

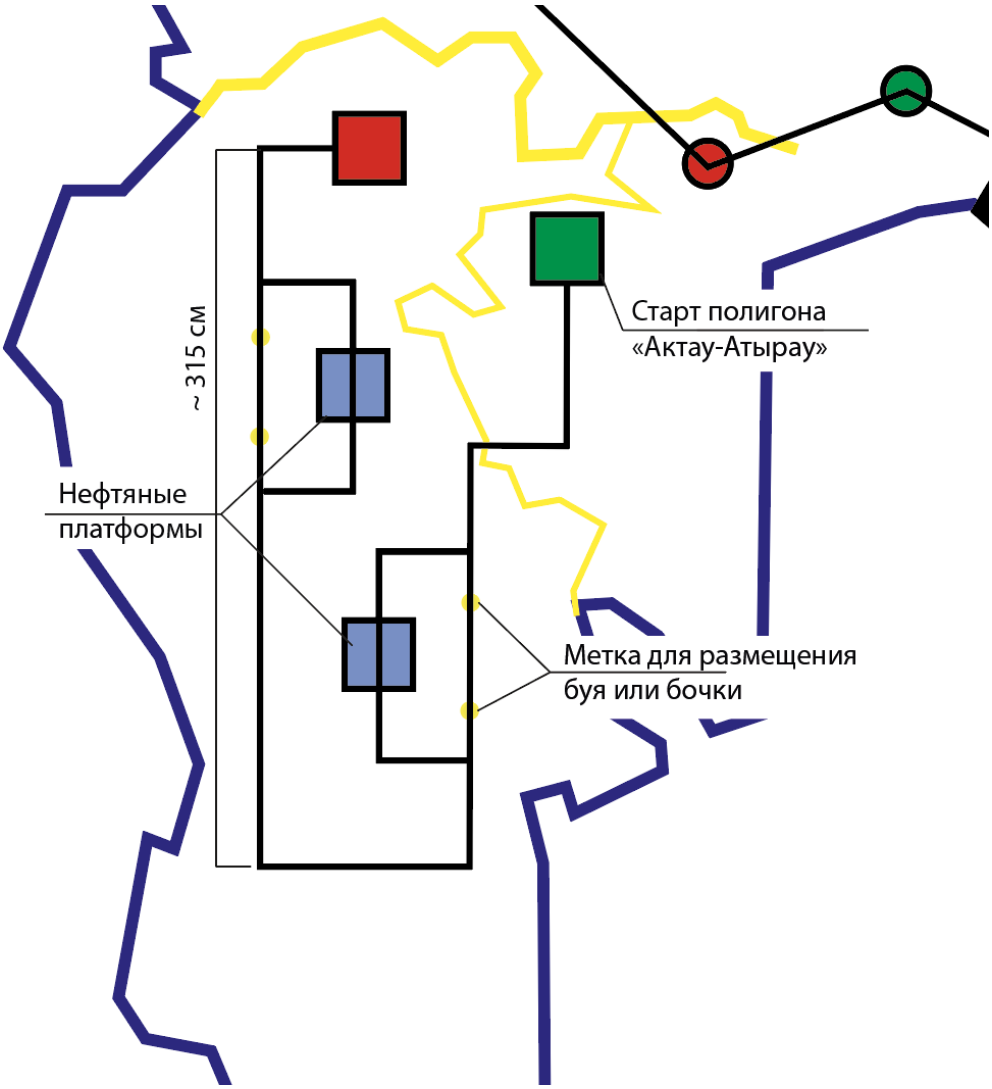
2.6.2.1. White field with a black line 16-25 mm wide.

2.6.2.2. Oil barrel – blue skittles, 12 cm high, 7 cm in diameter and weighing no more than 50 grams.

2.6.2.3. Buoy – red pins, 12 cm high, 7 cm in diameter and weighing no more than 50 grams.

2.6.2.4. Oil platform – a blue square placed on the field, measuring 30×30 cm.

2.6.2.5. There are 2 oil barrels and 2 buoys on the test site, one on each side. The location is determined randomly.



Rice. 10. **Test site "Aktau-Atyrau"**

2.6.3. Evaluation criteria.

Criterion	Points
Oil barrel is moved out of the placement zone (Blue pin is not touching the placement zone)	5×2
Oil barrel delivered to oil platform (Blue pin is completely in blue zone)	25×2
The buoy is in the placement zone (The red pin touches the placement zone. Points are awarded for non-zero results in the previous points)	15×2
Finish (The robot stopped in the red zone and its projection is completely in the finish zone. Points are awarded for non-zero results in the previous points)	10
Total	100

2.7. *Test site "Astana".*

2.7.1. The robot's task, starting from the green square, is to restore order on the field by placing the figures in their places. Black figures on black cells, and white figures on white cells. Then finish in the square with the red circle.

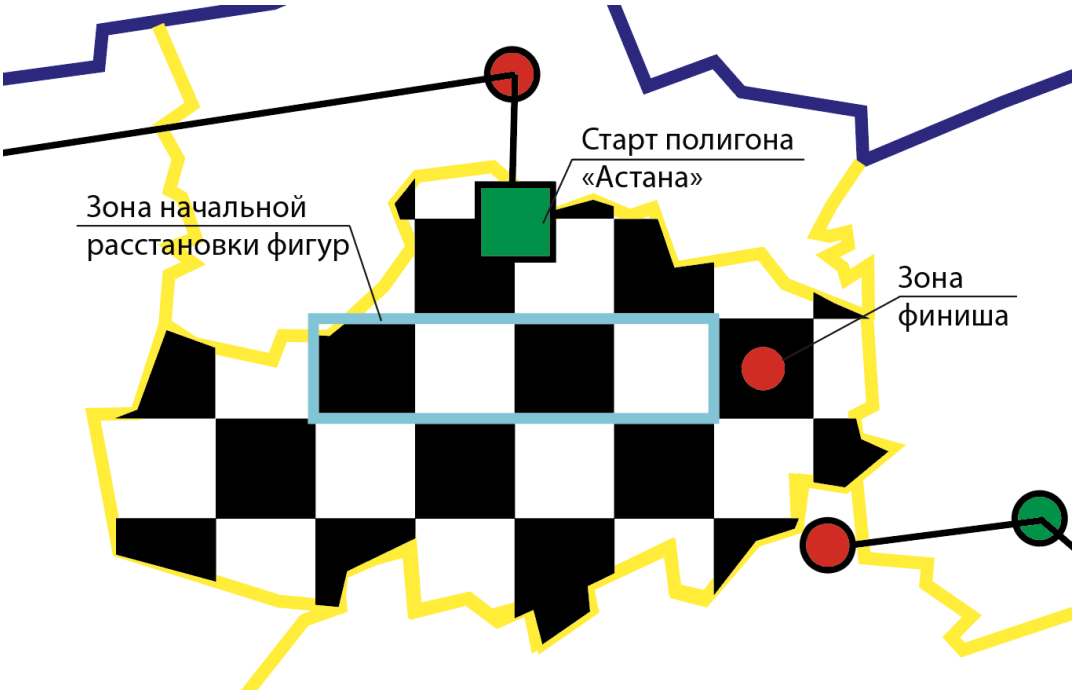


Fig. 11. **The Astana training ground**

2.7.2. Polygon elements.

2.7.2.1. The polygon is a field of black and white squares 40x40 cm and with a fixed finish point (red circle).

2.7.2.2. Black/white figures that are at least 12 cm high, at least 7 cm in diameter and weigh no more than 50 grams.

2.7.2.3. The location and color of the figures are determined immediately before the attempt. There cannot be more than one figure on one square. Each square can contain a figure of any color. If the color of the figure and the cell matches, the robot does not need to move it.

2.7.3. Evaluation criteria.

Criterion	Points
The figure partially touches the correct cell	5×4
The figure is completely in the correct cell	12×4
The figure is in the correct cell and has maintained its vertical position.	5×4
Finish (The robot stopped in the square with the red circle and its projection is completely in the black square. Points are awarded for non-zero results in the previous points)	12
Total	100

3. Procedure for holding the competition

3.1. On the competition day, teams first need to demonstrate to the judges the ability to move around the polygon passing through the cities. The robot needs to stop for 3 seconds at the red city and pass through the green cities without stopping. If during the attempt, all the robot's support points are on one side of the line, the exit from the track is counted. And the team is awarded points for the cities passed up to this point. The team has 2 attempts to pass through all 14 cities.

3.2. Movement on the map is carried out along the black line 16-25 mm, with the exception of the Baikonur Test Site, where movement is carried out along the inverse line.

3.3. City points - circles with a diameter of 20 cm (in places where there are no polygons) are marked in green, the robot can pass them without stopping. Red circles indicate the presence of a polygon for passing, at this point it is necessary to stop.

3.4. The first day is training. Teams can prepare throughout the day.

3.5. The second day is competitive. Participants can demonstrate to the judge the completion of the task upon readiness. Each polygon (city) can be submitted to the judge no more than 2 times.

3.6. No more than 3 minutes are given to complete each task.

3.7. The team starts the competition at the judge's signal. The robot must be completely located in the starting zone of the polygon (city) it wants to pass. After the judge's command, one of the operators starts the robot.

3.8. Upon completion of the polygon, the participant takes the robot. To complete the next polygon.

3.9. Completion of the map is considered complete:

3.9.1. When the time allocated for the competition day has expired

3.9.2. When the robot passes through all the polygons

3.10. Passage of the polygon (city) is considered complete:

3.10.1. If the judge stops the attempt, if the robot is unable to continue the competition and/or if the robot loses motor activity for 30 seconds (determined by the judge)

3.10.2. After 3 minutes allocated for passing the test site (city).

3.10.3. When the robot leaves the testing ground.

3.10.4. When a team member stops an attempt with a loud “Stop” command.

3.11. Upon completion of the attempt to pass the polygon, the participant can stop the robot manually at the judge's signal.

3.12. The time of completion and points for each polygon are recorded by the judge in the competition protocol.

4. Determining the winner of the competition

4.1. Determining the winner in the category « RoboLand Kazakhstan » is determined by the highest number of points scored in the least amount of time.

4.2. Maximum number of points for passing tests

Criterion	Points
Passage of the Karaganda training ground	100
Passage of the Ust-Kamenogorsk training ground	100
Passage of the training ground "Taldykorgan. Charyn Canyon"	100
Passage of the Baikonur test site	100
Passage of the Aktau-Atyrau training ground	100
Passing the Astana training ground	100
While moving along the black line, the robot made a stop at the red city (the robot's projection is in the zone for 3 seconds)	10×6
Total maximum score	660

Appendix No. 1

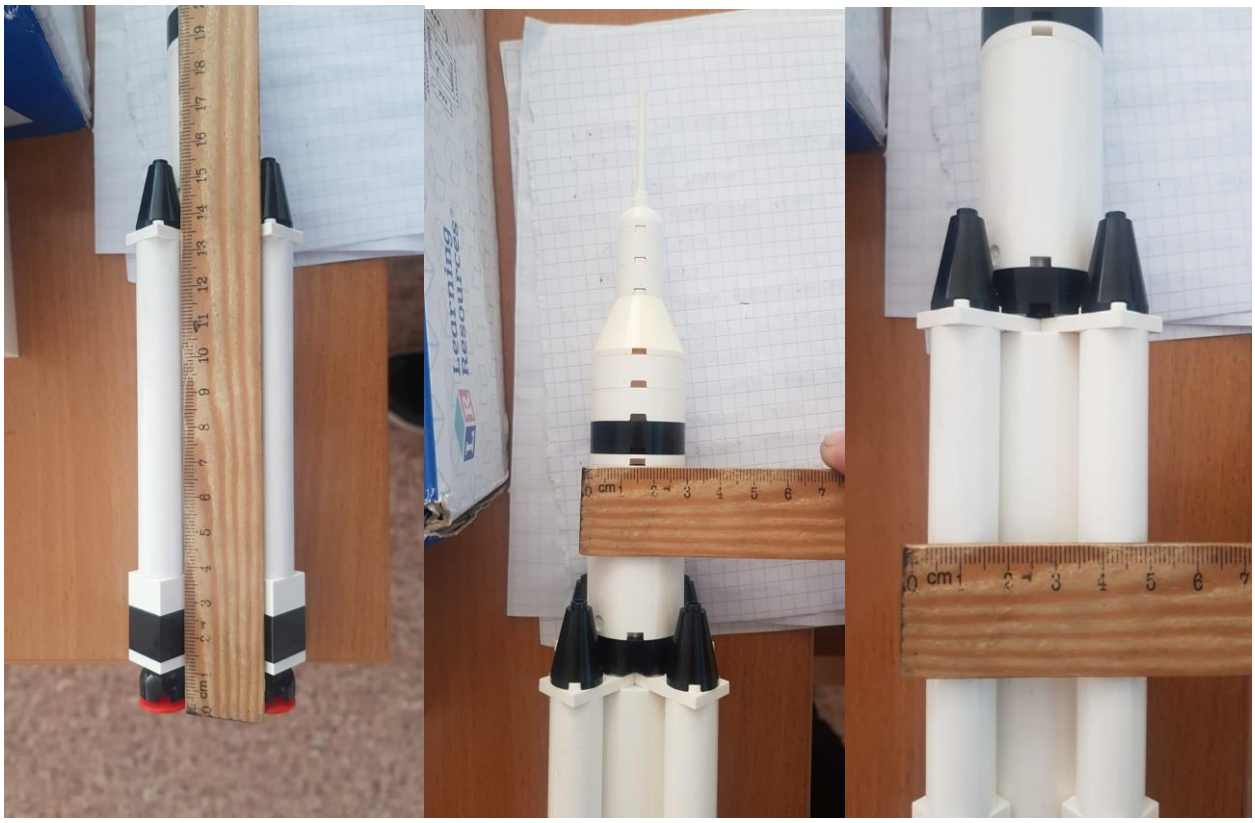


Fig. 12. **Rocket dimensions.**