« *FLYING INTELLIGENT ROBOTIC SYSTEMS* »
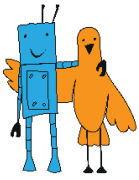# CONTEST RULES

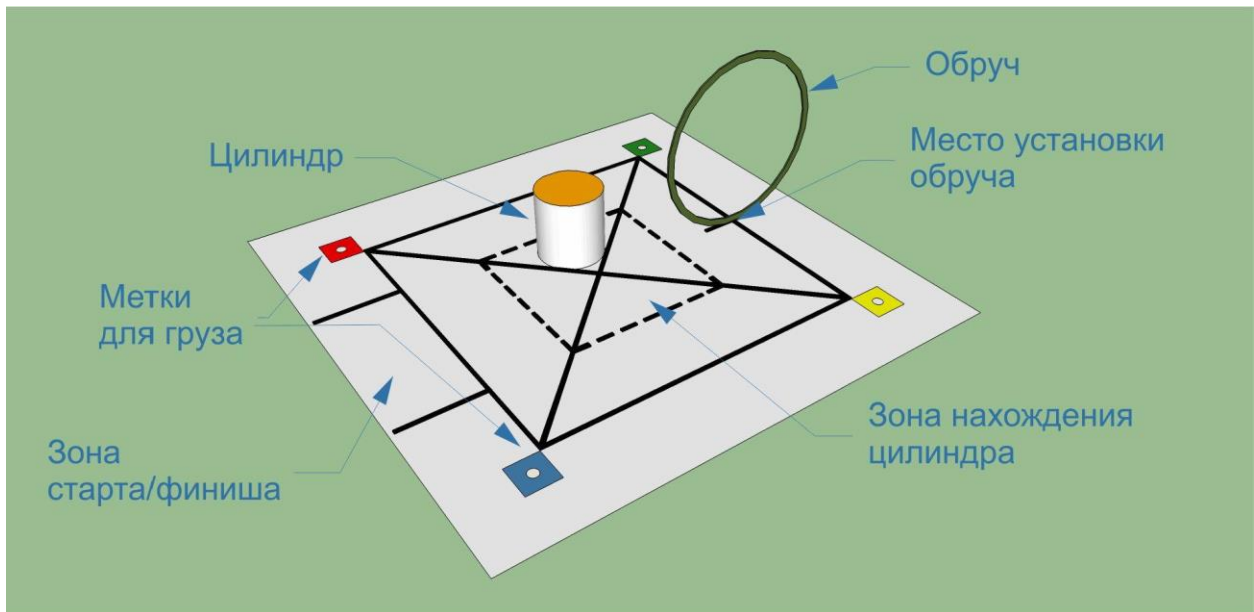*Version 2.0 dated 20 July, 2017*

Contents

1. General Rules

1.1. Task Description

The task is to create an autonomous robot that can fly in a limited indoor space. The robot must perform the tasks of detecting and delivering loads, precision flying through/over control points, flying around obstacles.

2. Field specification

Dimensions:
lenght is no less than 4 m;
width is no less than 4 m;
height is no less than 3 m.
The flying area is surrounded by a safety net.

The field of the flying area is a white banner with drawn black lines which are 2 cm thick (see the picture above).
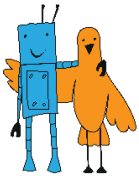
The field of the flying area is a white banner with drawn black lines which are 2 cm thick (see the picture above).

A cylinder (diameter is 40 cm; height is 30-60 cm) is put inside the square marked with dashed line at any place (in a-priori unknown). The cylinder flat end can be colored in yellow, green, red or blue.

There are four square marks (yellow, green, red and blue) in the corners of the field. Their positions and colors are known in advance.
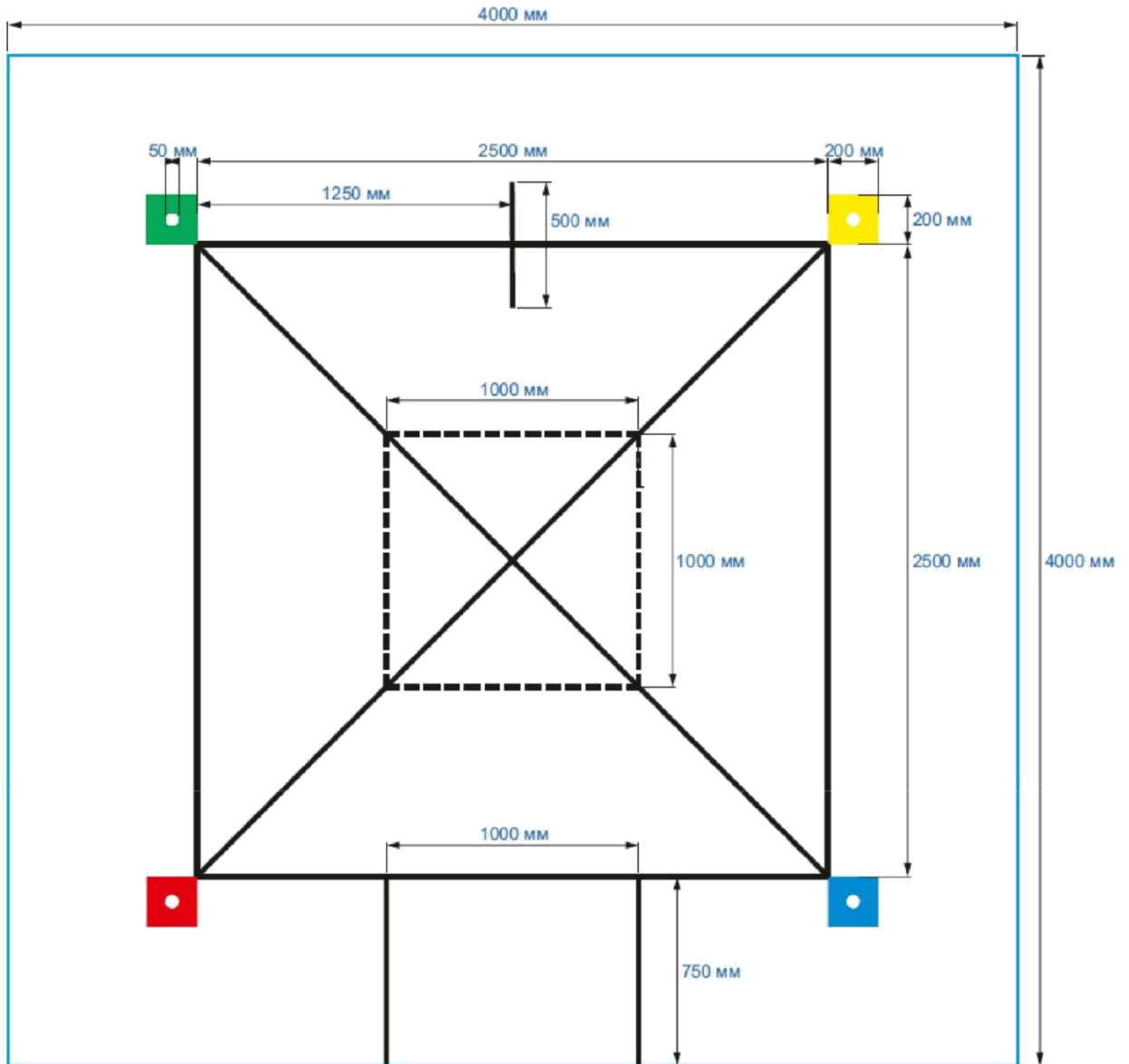
One-meter diameter hoop is placed between the yellow and the green mark.

Between the red and the blue mark there is a starting/finish area which has the shape of 1m x 0.75m rectangle limited on three sides by black lines.

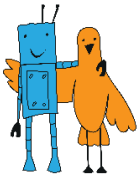The load to deliver is a 5x2x7cm cube with a metal face.

3. Game

The goal of the Contest is to score the maximum number of points by completing the maximum number of tasks within the allotted time.

The color and the height of cylinder indicate the location of the load which must be delivered on the cylinder. For example, if the cylinder is yellow colored and its height is 50 cm the load is on the yellow mark.

Color of the mark	Cylinder color	Cylinder height
1	**2**	**3**
Red	Red	30 cm
Green	Green	40 cm
Yellow	Yellow	50 cm
Blue	Blue	60 cm

3.1. Tasks and points

The team gets 10 points for landing inside the starting area. The task is considered completed if the robot takes off the field for more than 50cm and is staying there for no less than 10 seconds, then lands on starting/finish area, and stops all moving parts.

The team gets 50 points for landing on cylinder. The task is considered completed if the robot lands on cylinder and stops all moving parts keeping balance (the robot has not fall from the cylinder).

The team gets 5 points for flying over any mark except for the mark with load. An automatic laser sensor pointed upward from the center of each mark will estimate the robot's flying over each mark.

The team gets 20 points for landing on the mark which has the same color that cylinder has. The task is considered completed only if before landing the robot flies over the cylinder and gets points for it. The task is considered completed if any of the robot's parts is over the mark and at the same time the robot touches the field or the load.
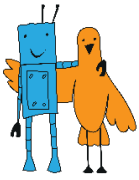
The team gets 50 points for taking the load. The task is considered completed if the robot lifts the load off the field and after the load has touched the field again at least a part of the load is outside the mark. No points are awarded if the load has been displaced by the air current.

The team gets 5 points for flying over the cylinder. An automatic laser sensor pointed upward from the center of the cylinder will estimate the robot's flying over the cylinder.

The team gets 20 points for flying through the hoop. Flying through the hoop is scored if the robot entirely left the hoop flying in by one side and flying out from the other side. If the robot flies through the hoop with the load, the team gets extra 20 points.

The team gets 100 points for delivering the load. The points are awarded if the load is on the cylinder after the ending of attempt.

The points for the tasks completed once more are not awarded.

3.2. Start

Each team is allowed 5 minutes for preparation. During this time one team member - the pilot is allowed to enter the flight area.

Only the pilots with safety goggles may enter the flight area.

Upon preparation completion or upon expiry of 5 minutes, the referee commences taking the 10 minutes long flight time and the pilot can launch the robot.

The launch must be performed from the starting area.

During the flight there must be no people in the flight area.

3.3. Restart

The flight is terminated when the robot has touched the safety net or when the pilot has decided to interrupt the flight saying «STOP!». The command can come only from the pilot, other team members cannot interrupt the attempt.

Restarts are allowed. The pilot may enter the flight area to relaunch the robot after clearance by the referee.

In case of restart, the referee's stopwatch is not stopped.

3.4. Finish

The attempt is over upon expiry of 10 minutes of flying time or by the referee's command.

3.5. Scoring

The team gets points for each fully completed task according to the Rules.
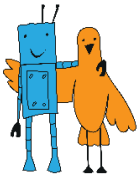
All points scored during one flight are summed up.

In case there were multiple launches, the points for each of them are tallied separately and the start with the maximum score is taken into account.

4. General Rules

To estimate the robot's flying over the mark the Organizers will use the following device: http://www.waveshare.com/laser-sensor.htm
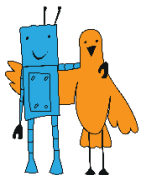
Effective operating distance is 0.8m.

The sensor will be modified by the Organizers to increase the visibility for the audience. When the robot passes the mark, a green LED will light up on the sensor, and an audio signal will be played. After activation, the sensor will turn off for one minute.

5. Layout or the Field

Layout of the field for printing in .crd format https://yadi.sk/d/YqHYZNIf3H8uzC

6. Revision History

№	Doc. No.	Date	Note	Previous Version	Update Version
1	2	3	4	5	6
9.					
10.					
11.					
12.					