



VERSION 3.0 2018-12

SITUATION

In 2019, it is the third season for the Hockeybot league. This year, not only you can play matches against other teams in remote controlled games, but you can also participate to an autonomous skills competition. This is not to be missed!.

OVERALL FUNCTION OF THE ROBOT

You will need to design robots allowing you to play hockey as a team. Each team will develop 2 robots representing attacking players. Zone01ORC will provide **the goalkeepers and the sticks**. There will be 6 players on the playing surface. Attacking players will be remotely controlled while the goalkeepers provided by Zone01ORC will play independently

The objective is to score goals in the opponent's net by shooting the puck there. Players must move on the surface to retrieve the puck, pass and shoot on goal.

Sometimes robots might come into contact. However, the contact must not be the result of a deliberate act to hit the opponent. If that was the case, a penalty will be given.

Robots must move the puck by **handling it with the stick**. Trapping the puck to move it is not allowed. **No concave section can hold the puck except the stick itself**. There is **only one stick** per player.

In case of a tie after three periods, shootouts will take place.

Players will be remote controlled during the matches but need to be autonomous during the skills competition.

DESCRIPTION OF THE ROBOT:

The dimensions of robots participating in this challenge must not exceed the following limits:

- A. Length without the standard stick: 20 cm
- B. Width without the standard stick: 20 cm
- C. Height: no limit
- D. Mass: no limit

The robots must use Zone01ORC model regulation sticks for the challenge **made of LEGO parts**.

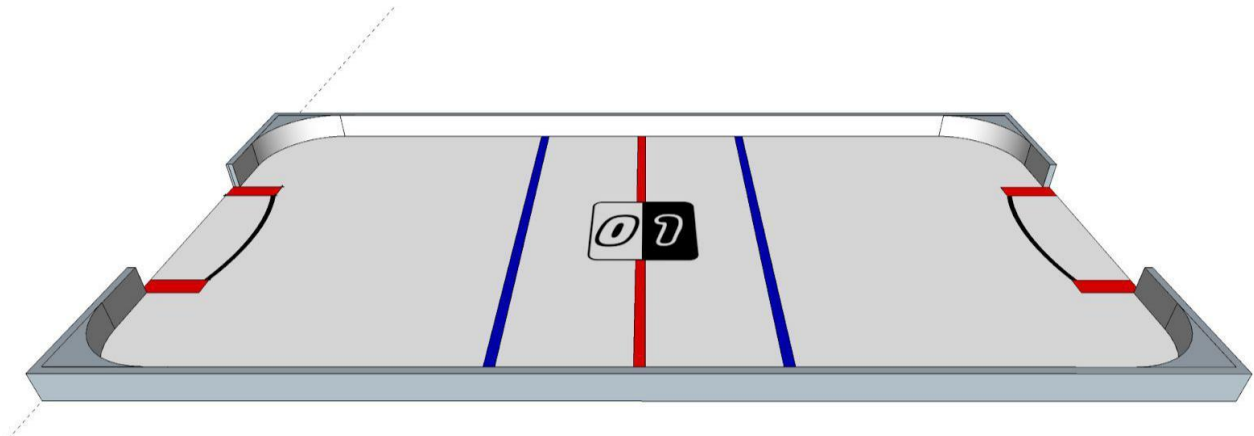
Motors cannot exceed the following specs:

- Medium Torque motor: Speed < 250 RPM, **Running** Torque < 8 N/cm
- Large Torque motor: Speed < 180 RPM, **Running** Torque < 20 N/cm

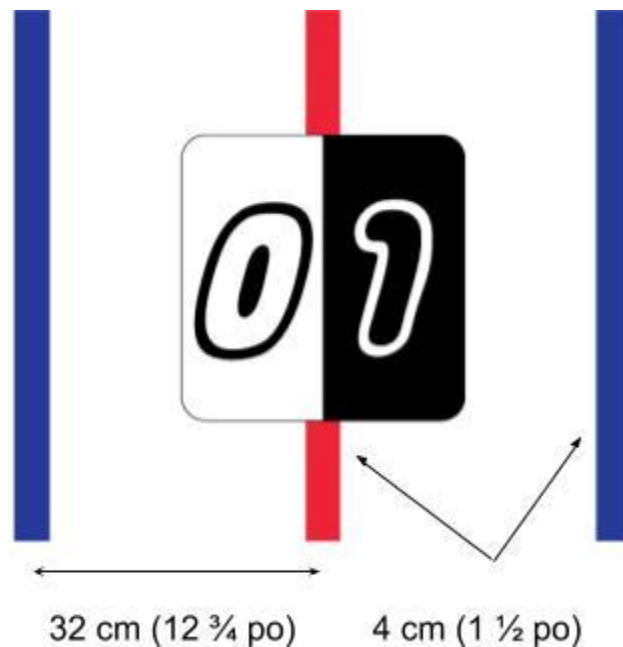
DESCRIPTION OF THE ACCESSORIES:

a. Rink and goalkeepers

The rink is made with a 4 X 8 foot table (120 cm X 240 cm) surrounded by boards about 7 cm high.

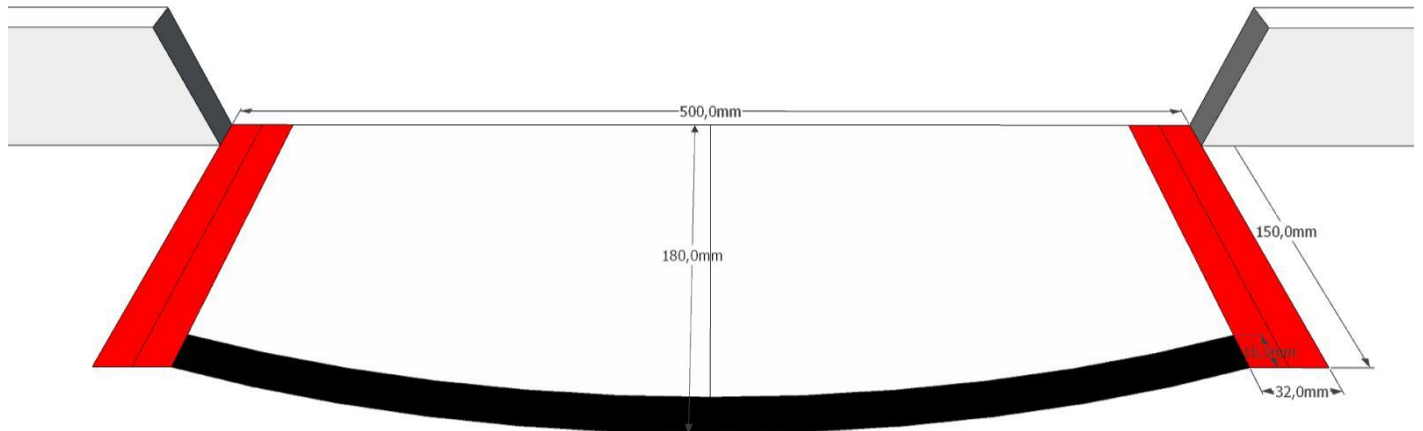


Corners are rounded with a 20 cm radius (8 inches).

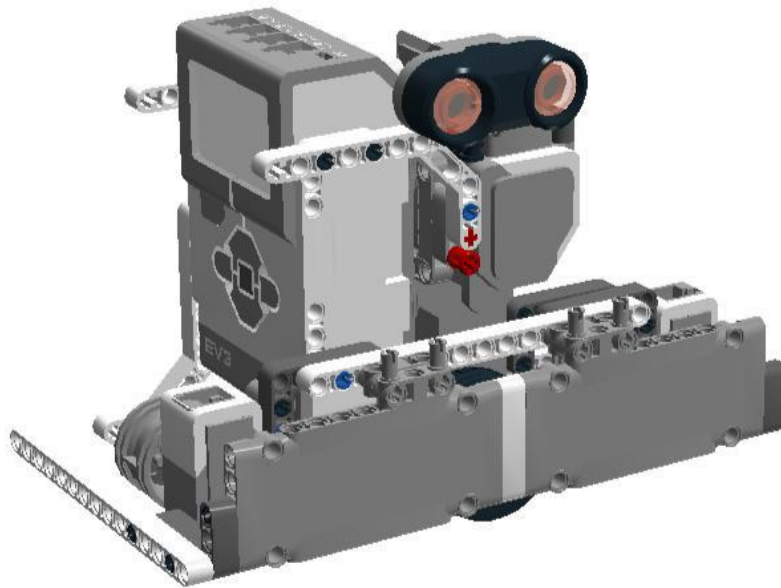


Position of the main red and blue lines

Two 50 cm openings in the boards (at each end of the ice) will serve as goals.



Lines will serve as reference points for the independent goaltenders provided by Zone01ORC.



The installation plan and the independent goalie program are available on the ORC website.

b. Puck

The puck does not contain an integrated tracking system. It is made of 3 pieces (2 LEGO gear wheels and an axle).



c. Sticks

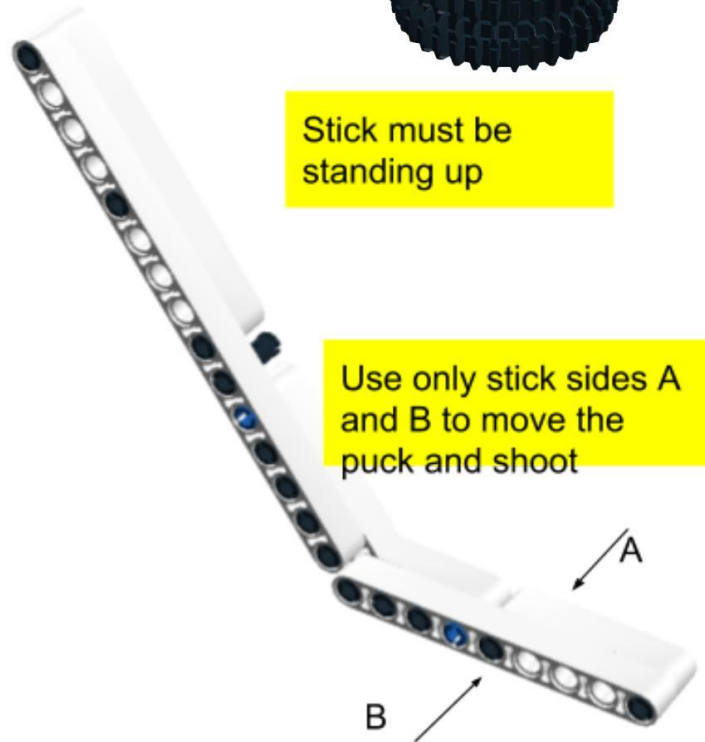
ALL HOCKEYBOTS MUST USE THE STICKS PROVIDED BY ZONE01ORC SHOWN ON THE RIGHT. YOUR ROBOT MUST HAVE A MECHANISM TO HOLD THIS STICK STANDING UPRIGHT.

The sticks must be held **standing up** by the top part (first 9 holes on the top beam). The bottom part should not touch the player and must not be altered.

It is not allowed to shoot using a mechanism to hit the stick. Moving the stick is only possible by handling the stick from the top part or by moving the whole robot.

Stick must be standing up

Use only stick sides A and B to move the puck and shoot



d. Permitted remotes

Several types of remote control are permitted

1. communication
2. (LEGO) An EV3 or NXT brick with Bluetooth A phone or tablet
3. (LEGO) A [Mind sensors PSP-NX](#) communication module with the Mindsensor remote control or a PlayStation remote control
4. Other controller provided by the material manufacturer

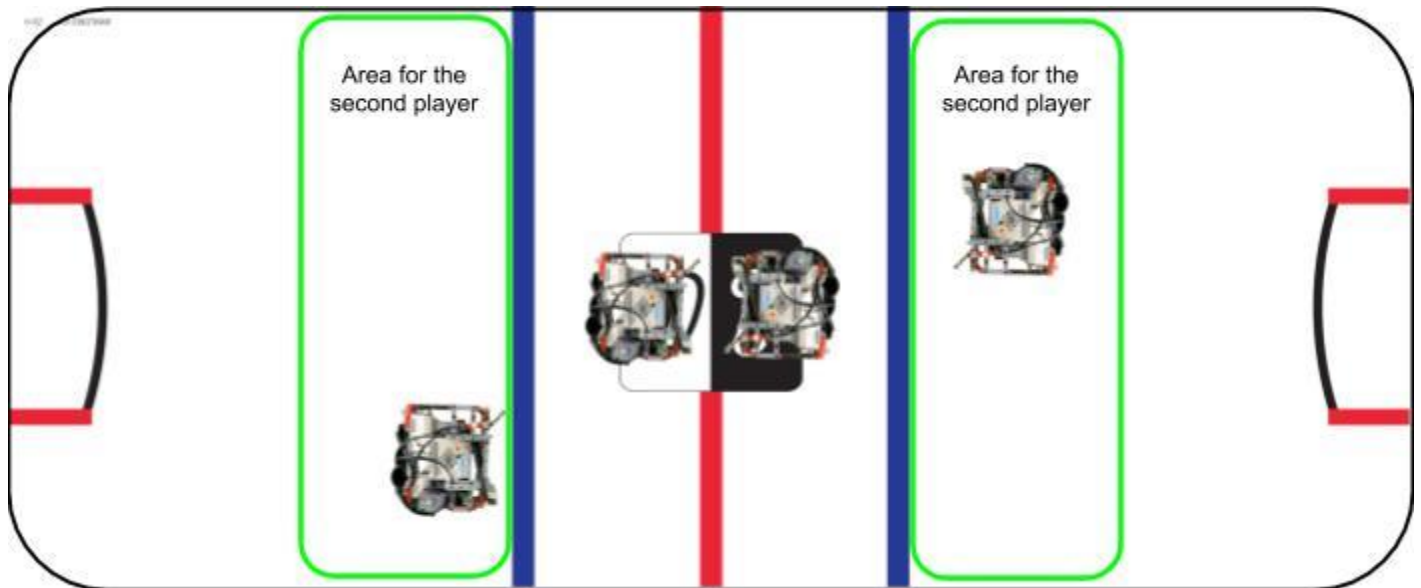
NOTE: Teams using the third option will be significantly advantaged.



DETAILED DESCRIPTION OF THE CHALLENGE - GAMES

Time Allowed
3 periods of 60 seconds and a shootout if case of a tie
The Game
Teams present themselves with their robots, which they set on the playing surface. Zone01ORC installs a goalkeeper for each side. Attacking players position themselves for the face-off at centre.
The goalkeepers are set in operation, then the judge conducts the face-off for the first period.
The players try to get the puck, make passes and score a goal.
When a goal occurs, the judge resumes the game in the central area.
Once the period is over, the game stops and then resumes in the same way for a second period, and then for a third time. Teams change sides after each period.
Once the three periods have been completed, if there is a tie , the shootout begins. The goalie remains in standalone mode. The attacking player cannot enter the goalkeeper's area. A shot is considered completed if the puck enters the goal area, crosses the goal line, goes in the goal, touches the goalkeeper, or when the 10 seconds are up. Each player is allowed one shot. ** In the playoffs, if there is a tie after the regulation shots, the goalkeepers are removed from the surface. **
Penalties: If a robot intentionally hits another robot, causes interference to the goalie making it lose its line or delays the game by willingly trapping the puck, a penalty will be awarded. During the penalty, the player must put down its remote control and the penalized robot is moved to its blue line against the boards.

PLAYERS POSITION FOR FACE-OFFS

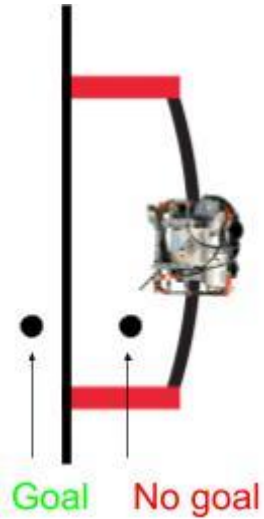


The face-offs always take place at centre. Only one player from each team is permitted to position himself in the centre area to receive the puck. The other player must position himself behind his blue line.

A face-off is held to begin each period and when a goal is scored.

During the game, if players are stuck and the puck is not moving, the puck will be removed and placed in the center without stopping the play.

GOAL:

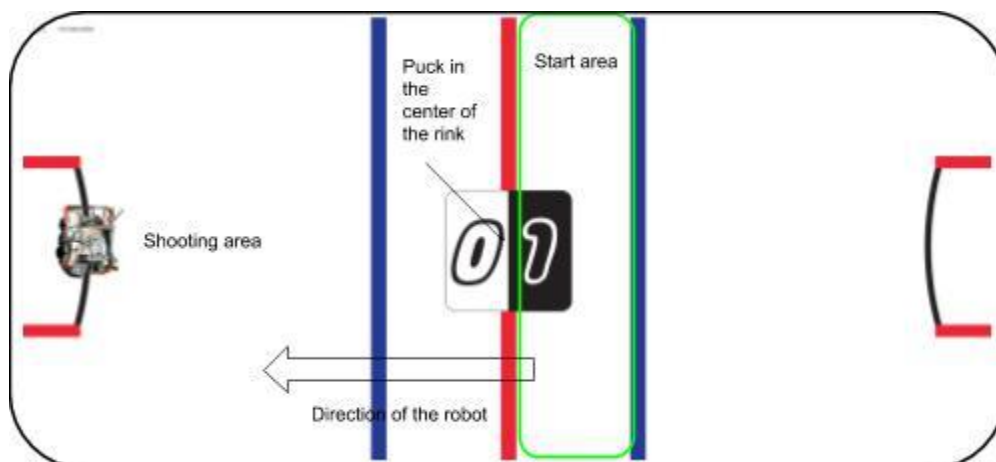


For a goal to be considered valid:

- It must have taken place without moving the goalie.
- The puck must leave the surface, as shown in the diagram on the left.
- The puck must be pushed or hit with the stick into the goal, unless it is an accidental rebound.

PLAYERS POSITION FOR SHOOTOUTS

If there is a tie, then a shootout is required, the puck is placed in the center of the rink and the player is placed in the Start Area on his side of the rink.



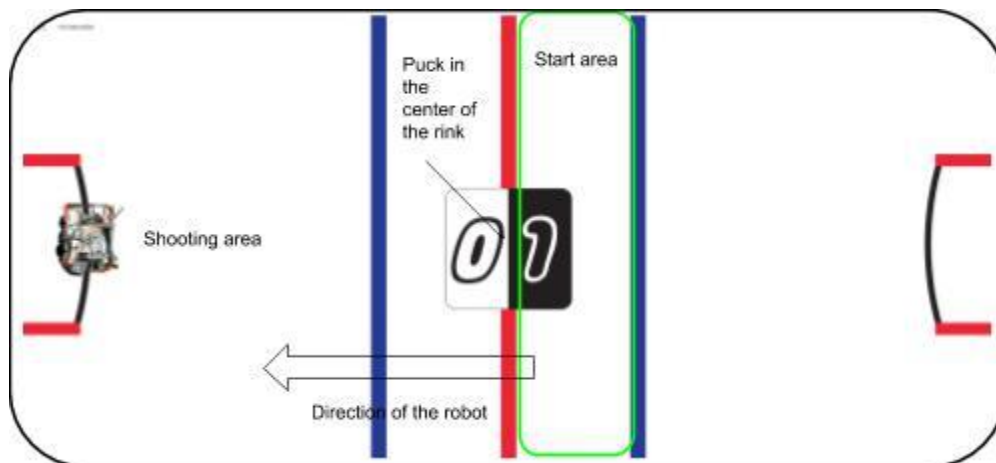
SKILLS COMPETITION

The skills competition is made of short missions to solve to earn points in a very limited time. The time is not recorded.

The skills competition will take place after the games and before the series, using the same players (no modification allowed). Each team can try the missions once. For each mission, the team can decide which player is going to participate.

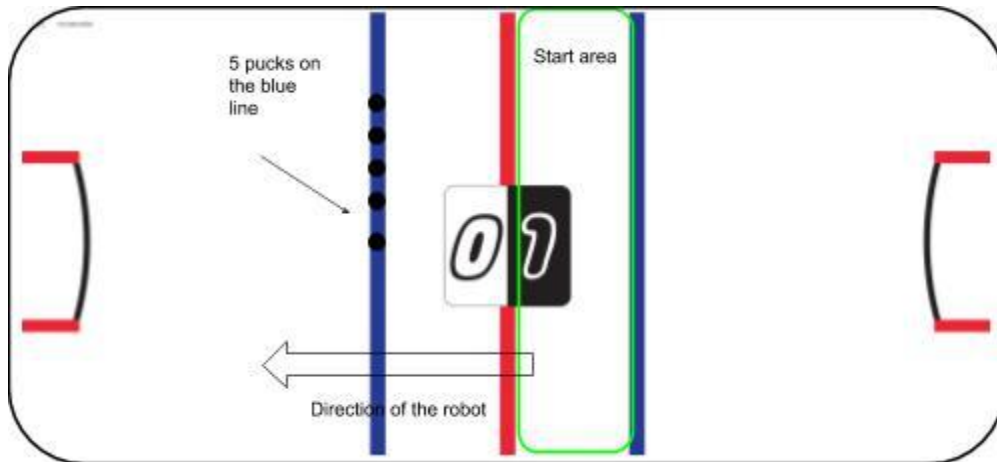
Mission 1: Autonomous shootouts

The player is allowed to perform two autonomous shootouts. The puck will be placed in the center of the rink while the player is placed in the Start Area. On the judge signal, the team presses a button and the player has 10 seconds to score against the goalie.



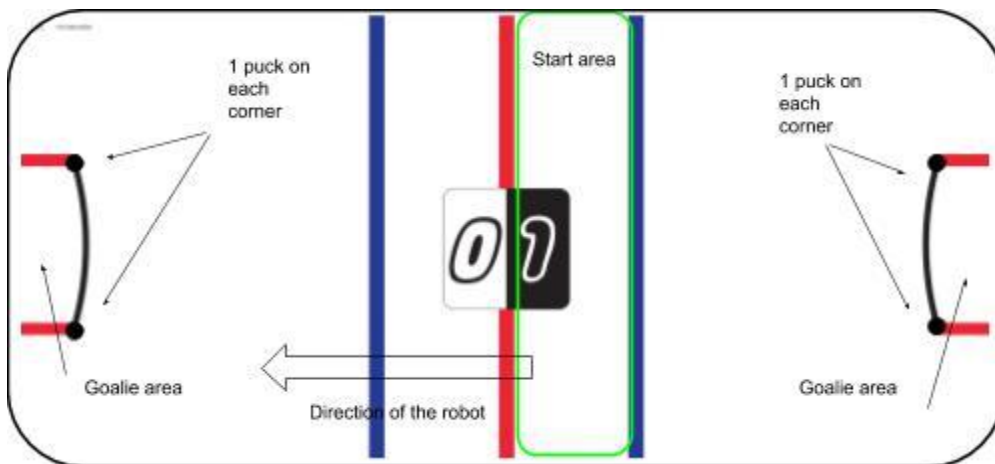
Mission 2: Fast shooting

The team will place 5 pucks on the blue line and the player in the Start Area. At the judge signal, the player has 10 seconds to shoot each puck in an open net. The mission is stopped when the time is up or if the robot moves completely beyond the blue line.



Mission 3: Fast up and down

Four pucks are placed on the rink, on each of the goals red lines (end of the line). The player is place in the Start Area. At the judge signal, the player has 10 seconds to push the four pucks into the goalie areas. The mission is stopped if the time is up.



Mission 4: XXXXXXXX

The fourth mission will be disclosed at the event!

SCORING TABLE - SKILLS COMPETITION

MISSIONS	MAX POINTS
Mission 1: Autonomous shootouts - 20 points per goal	40
Mission 2: Fast shooting - 10 points per goal	50
Mission 3: Fast up and down - 10 points per puck in a goalie area	40
Mission 4: *****	50
TOTAL	180

SCORING TABLE - GAMES

If a player scores in the opponent's net	1 goal
If a player scores in his own net	1 goal for opponent
If a player scores in the net during a shootout	1 goal

PENALTIES

Roughness (intentional contact with another robot)	20 seconds
Interference (blocking the way of a player who doesn't have the puck)	20 seconds
Goalie interference (entering into contact with the goalkeeper and making him lose his line)	20 seconds
Delay of game (willingly trapping the puck when not a goalkeeper)	20 seconds

If a team is scored on when one of its players is serving a penalty, the goal cancels the penalty.

TEAM RANKINGS AND PARTICIPATION IN SERIES

Each victory is worth 2 points to the winning team. A tie game is worth 1 point. No points are awarded for a defeat. The teams with the most points during the games will be able to participate in the playoffs.

b. Rule in the event of a tie for participation in the series

If several teams have accumulated the same total points, the ranking of these teams will be established in the following manner. If the first criterion does not make it possible to rank the teams, the following criterion will be used and so on.

1. The total number of victories
2. Goal average (total number of goals "for" / total number of goals "for" and "against")
3. The total number of goals "for"
4. A coin toss

STRATEGY SUGGESTIONS

- Practise remotely controlled movements and puck handling
- Develop automatic programs for the skills competition

Frequently Asked Questions

As the season progresses, questions and clarifications are made to the challenge. Do not forget to check out the FAQ below.

Q1: Can the stick be held flat on the ice?

Answer: No, it is no more allowed in 2019. The stick must be held standing up like in real ice hockey.

Q2: If the robot gets stuck, should it come back to a specific location for repair?

Answer: If a robot loses its stick, gets stuck or is unable to play, its operator must ask the referee for permission to take it back and await his agreement before retrieving it for repair.