



**The international robotics competition  
"ROBO-VEHICLE PILSEN 2023"  
6. 3. – 9. 3. 2023**

### **Annotation**

The task is to construct a robotic vehicle, present it in front of an international jury in English and drive it along a defined track in the shortest possible time. The vehicle will transport a cup with a measured amount of water, which it must not spill. Competing teams will be graded also for the design of the stroller.

The competition will take place in the city Pilsen. If the competition team could not participate in person, it will be allowed to participate online.

The goal of the competition is to deepen cooperation between schools in the field of digital competence development. This is important for the future job market, comparing skills between schools and getting new inspiration for pupils.

Teams from the Czech Republic, the Slovak Republic, the Republic of Croatia, the Federal Republic of Germany, the People's Republic of China, the Principality of Liechtenstein, the Republic of Finland and the Republic of Turkey are invited to the competition.

### **Team description**

Each country can enter up to six teams in the competition. One team consists of two students between the ages of 17 and 20. During the competition, the teams work independently without the intervention of their teacher or an adult.

### **Technical conditions**

#### **Vehicle specification**

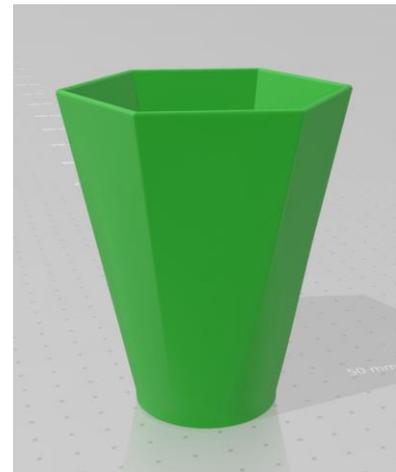
- maximum size of the robotic vehicle (length x width x height): 200 x 200 x 200 mm
- number of axles: no restrictions
- chassis: no restrictions
- motor performance: no restrictions
- vehicle powered by: electric motors
- the wheels/tracks and other technical mechanisms of the vehicle must not damage the track or its surface
- the vehicle will consist of one unit

#### **Vehicle control unit**

- any platform (Arduino, Picaxe, Raspberry, LEGO ...)
- the vehicle must be fully autonomous and must not include any possibility of remote control (wi-fi, Bluetooth, etc.)

### The water cup and its placement on the vehicle

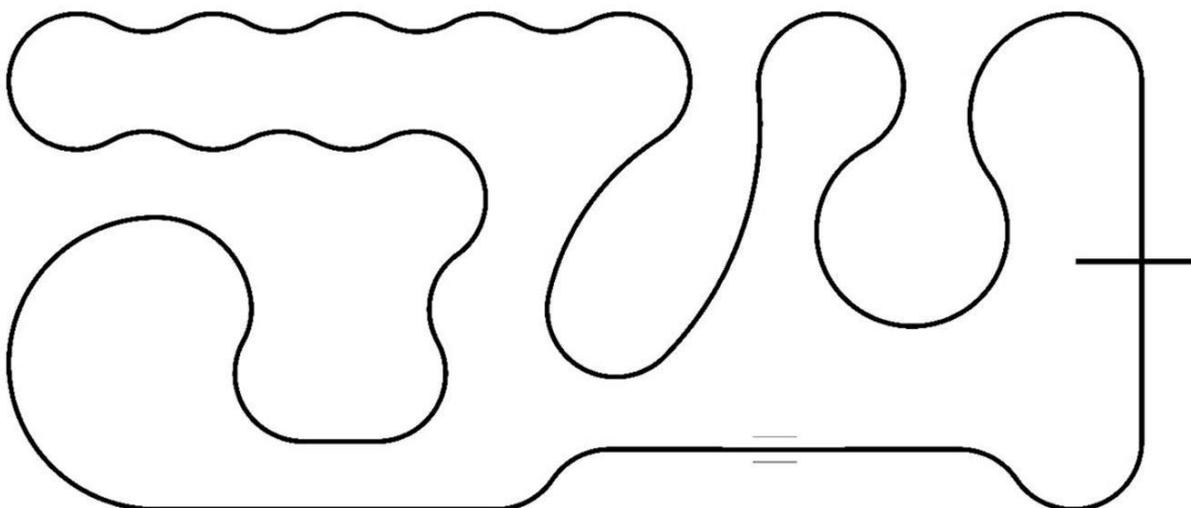
The water cup will be built into the lining in the shape of a ring. The inside diameter of the liner will be a little larger than the outside diameter of the bottom of the cup. The water cup must stand completely freely in the lining. It must not be clamped. The inside lining must not be higher than 5 mm. The cup base has a slot for fastening it onto the vehicle using M3 screws; the slot allows for some clearance in fastening the cup base to the vehicle. It is forbidden to change the shape of the cup base or otherwise modify the cup placement in any way. It is forbidden to change the size of the cup or modify its shape (the color and the material from which the cup is printed do not matter - ABS, ASA, PET, ...).



### Track specification

The surface of the track is made up of a flat white sheet 2000 x 4000 mm in size, on which there is a curving black line (15 mm wide) forming a closed loop. The black line does not intersect anywhere, is not interrupted at any point, and the start and the finish line are formed by a black line which intersects the black guiding line.

### Track shape



**School will have before the competition:**

- one carpet with the track
- one cup base
- one water cup
- special software application for time measurement

## Competition rules

### Best Performance category

A measured amount of water – 70 ml – will be poured into the cup before the start of the competition. If the cup with water is knocked over, the vehicle must be placed at the start again and the cup must be refilled with the prescribed amount of water. A robo-vehicle transporting a cup of water must pass the track in the shortest time possible without spilling the water in the cup. The track is formed by a guiding black curved line on a white background. The line does not intersect anywhere, the start line is also the finish line. The vehicle must start on the black line, cross the black line crossing the track by itself and, after safely crossing the track, automatically stop behind the black line crossing the track. In the case of driving off the guiding black line, the vehicle must be placed at the start again. If the vehicle returns to the guiding black line by itself, it can continue to the finish. In the case of re-positioning the vehicle at START, all times are added up. The vehicle can be placed on START a maximum of 3 times. The total time to pass the track, including repositioning the vehicle at START, is 7 minutes. A competition team can use the full track time - 7 minutes. The time measurement will be done electronically. The best time to pass the track will be entered in the score sheet.

### Best Design category

The evaluation panel monitors and assesses:

- original vehicle fairing (color, build quality and sophistication, ...)
- protection of the electronic components from water damage
- lighting effects (headlights, flashing lights, ...)
- untraditional sounds (siren, warning acoustic signals, ...)

### Best Presentation in English category

An electronic presentation (format .ppt; .pptx; .pdf). Any format of presentation will be penalized by deduction of points. Both members of the team can present. The presentation is for a maximum of 10 minutes.

The presentation shall contain:

- a brief description of the vehicle
- a description of the most interesting technical parts and their solution
- the greatest success in constructing the vehicle (electronics, design, mechanical construction, programming, fine-tuning, ...)
- the biggest problem in constructing the vehicle (electronics, design, mechanical construction, programming, fine-tuning, ...)
- the benefits for one's own professional development
- references to resources used (websites, publications, ...)

## Evaluation description

The evaluation panel shall consist of experts from the University of West Bohemia. It is also possible to include representatives of the universities of the participating states.

The evaluation panel will evaluate the following categories:

- Best Performance
- Best Design
- Best Presentation in English
- Overall Best team

## Prizes

- 1st to 3rd place in Overall Best team category; ROBO 2022 cups and certificates for the top 3 schools,
- 1st to 3rd team in the Best Ride category: prizes for competitors
- 1st to 3rd team in the Best Design category: prizes for competitors
- 1st to 3rd place in the Best Presentation in English category: prizes for competitors
- Techmania Science Center, o. p. s. will present prizes for the popularization of science
- All competitors will receive certificates of participation
- Both members of the team receive the same prizes.

## Competition organizers

The Pilsen Region  
The University of West Bohemia  
The Secondary Vocational School of Electrical Engineering, Pilsen, Vejprnicka 56

## Competition partners

Techmania Science Center o. p. s.  
New technologies – Research centre, The University of West Bohemia  
Faculty of Applied Sciences, The University of West Bohemia  
Ladislav Sutnar Faculty of Design and Art, The University of West Bohemia

## Contact information regarding the organization of the competition

### Organizational issues:

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### Contact with schools:

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**Contact for The University of West Bohemia, the Best Presentation in English category:**

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