

SIMULATED MARS ROVER MODEL COMPETITION – PANDEMIA PLANS A AND B

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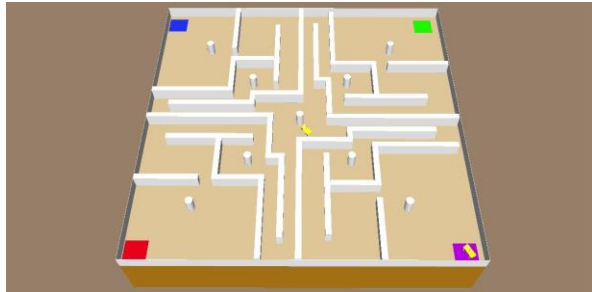
Introduction: If you have a plan A, you should always have a plan B as well. The present global COVID-19 situation has left its mark on the possibilities imaginable. Plan A is to have our usual race in a real place with people who have actually arrived at the venue. Plan B is to have our unusual race in the virtual space with CAD-CAM solutions, which have to arrive in digital form to the organizers in time.

We reported about the Competition in the previous years (Sipos, Vizi 2009-2022) [1,2,3,4,5,6,7,8,9,10] at the 40th-51th LPSC and at several conferences in Hungary, e.g., at H-SPACE 2016 - 2019 [11]

Plan A – The real competition:

Let us hope we can organize a real contest, a live event. The task of the year 2022 is as follows:

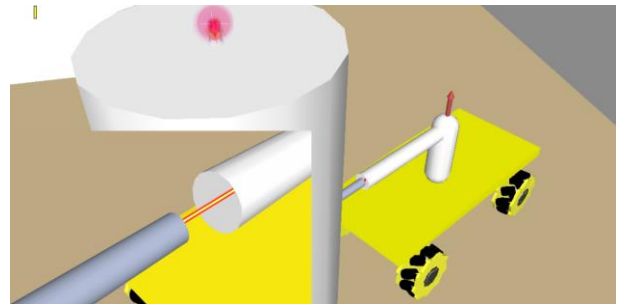
Plotting board with targets: The plotting board is an 8 x 8 m field with 9 perpendicular pillars with 20 cm in diameter and nearly 40 cm high on the top with RGB LED (red, green, blue and together white). Targets are the pillars, and on them horizontal pipes with a few cm length and 1 cm diameter, in random directions and at different heights from 8 - 14 cm from the floor in three direction (3x120 degrees) and with 8 cm length. Maze-like obstacles make it difficult to approach the columns on the stage and that is why omniwheel wheels are needed. The wall of the maze is 20 cm tall.



Robot: To build at the venue before the race a remote controlled and/or autonomous robot car with omniwheel wheels and a 'camera targeted laser' on a telescope which is moved by a servo motor up and down to adjust the height of the laser gun, which is horizontal. The camera can be used to target the goal pipes.

Task and goal: To control the rover near the pillars, targeting the sensors at the inner end of the pipes. Four rovers are on the stage on time together, and every rover has its own color and software code to control the laser. Laser with the code sequence lights the sensors inside the pipes, and if targeting has been successful, the

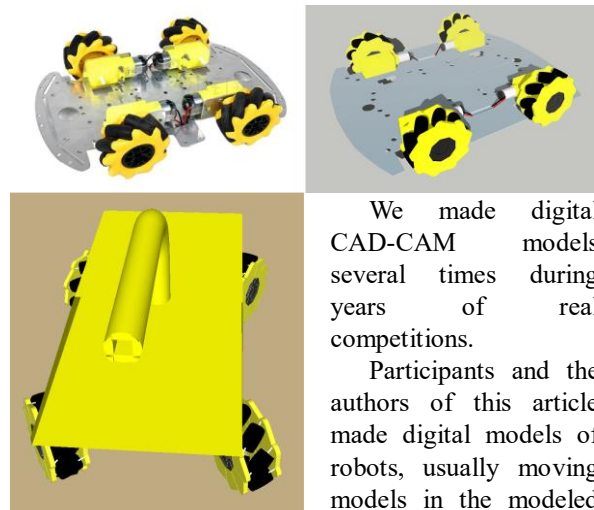
team's color will be set and flare up on the RGB LED at the top of the pillar.



Parts provided by organizers: According to sponsors we want to provide competitors with some parts of the robot: wheel set with four omniwheels, servo motors and batteries.

Plan B

The global COVID-19 situation is rapidly changing, and if we do not obtain the permission to organize a real contest in accordance with the actual regulations of the government, then we will go into virtual space.

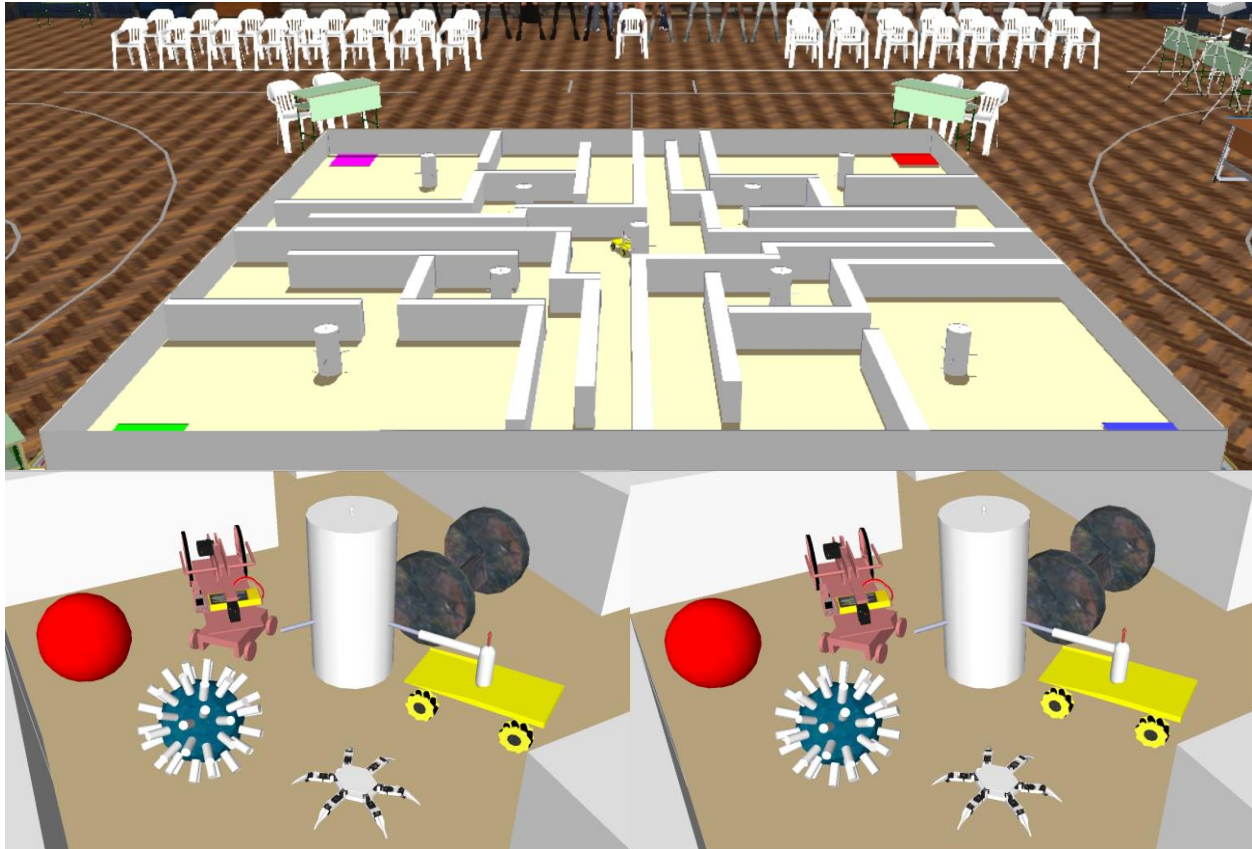


We made digital CAD-CAM models several times during years of real competitions.

Participants and the authors of this article made digital models of robots, usually moving models in the modeled

version of the real plotting board before the contest. We made animation videos with the moving models and we put that movie parts into the promo clip of the Competition. [12,13,14,15,16,17,18,19]

Plan B and its virtual task is to make a CAD-CAM robot with the plotting board (or a part of it) and to simulate the real situation, and, in addition, to record the full process on computer and with a mobile phone from the monitor of the computer to show the full solution for a better place. [20]



In the picture, you can see the plotting board 2022 in the virtual space which the same as the real place, the gym hall next to the Óbuda University, Székesfehérvár, Hungary, and the robots of last years in the virtual space in a crossed eye stereo picture.

The jury will accept a simple animation movie also showing the solution of the task.

Our plan is to make an official common virtual stage if the virus situation does not allow the live contest in the future. We will select the virtual stage from available cheap or free of charge virtual realities. [14][15]

Conclusion: The past two years were marked by “a duty to rescue”. To save our health and, after that, a duty to rescue the Competition itself. It is becoming more and more difficult to ensure the supply and encouragement of young people in the face of many unfavorable conditions, but they are also providing new opportunities. However, nothing can replace the atmosphere of competitions, where young people can get to know each other and compete by learning, while learning the art of collaboration.

References: [1] SIPOS,A., VIZI,P.G.: LPSC40 #2519 ; <http://www.lpi.usra.edu/meetings/lpsc2009/pdf/2519.pdf> ;
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[12] Vizi, Sipos, MaM2012, <https://youtu.be/Z0nyy8PmsX4>
[13] Vizi, Sipos, MaM2013, <https://youtu.be/12nfdyYfBOE>
[14] Vizi, Sipos, MaM2014 The Virtual Venue 1, <https://youtu.be/aXpx6pdqCgU>
[15] Vizi, Sipos, MaM2014 The virtual Venue 2, <https://youtu.be/xU-dTuxb3Tc>
[16] Vizi, Sipos, MaM2015 <https://youtu.be/wKHDJr5An1A>
[17] Vizi, Sipos, MaM2016 https://youtu.be/74zLqX_iUvg
[18] Vizi, Sipos, MaM2017 <https://youtu.be/W7QuzevdiH8>
[19] Vizi, Sipos, MaM2018 <https://youtu.be/EsBXHXzP1Zg>
[20] Vizi, Sipos, MaM2022 <https://youtu.be/L8wkP5CQcbE>