



A Collaborative Robotics Program

2020 Alpine Bot Challenge Rules

Goal : Design, build, and program a robot that can climb a steep inclined plane, get onto the table top (flat surface) and place a flag down in the target zone. Completing the challenge before the time limit ends adds Bonus Points to your score.

Divisions: Teams entering this challenge compete in Elementary School (ES), Middle School (MS), High School (HS), and University/Professional (UP) divisions. *(Note: If there are fewer than 5 teams registered in any division, the Event Director has the option to combine divisions).*

Robot: Autonomous robot, any platform, costing \$1,500 USD or less, and meets the following design constraints, which will be verified during Check-In:

- No flying robots.
- Multiple sensors and processors are allowed.
- Volume of the robot must not exceed 65,030 cm³ in it's starting configuration.

General Rules of Play and Scoring:

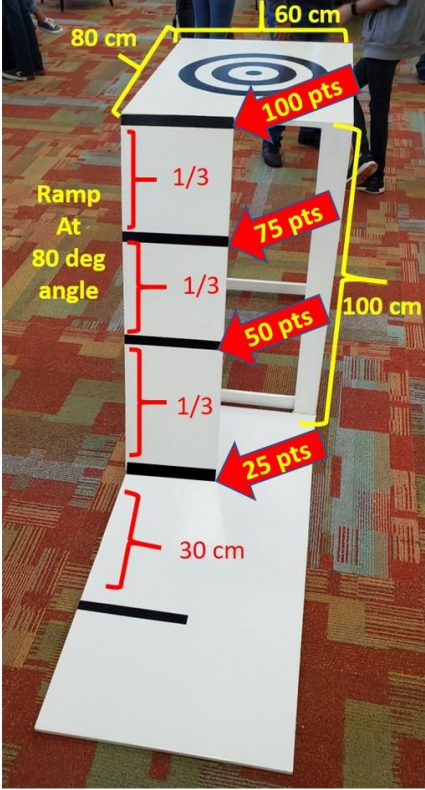
- The Event Director will establish the number of official runs allowed, and the number of those official runs that will be counted for the aggregate score used to determine the Top 8 teams that will compete in the Tournament.
- Refer to the scoring matrix below for point values for each portion of the challenge.
- The robot has 2 minutes to complete the challenge with the clock running backwards from 120 seconds.
- Teams can Practice as much as necessary, taking turns with other teams needing to practice. Should the track be needed to score an official run, practicing teams will yield the track. Once the tournament period has begun, practice is no longer allowed.
- ES teams will start their robot either on the floor in front of the ramp, or on the ramp at the bottom. MS, HS, & UP divisions must start on the floor behind the start line 30 cm from the base of the ramp.

- 1 • Touching the robot at any time requires it to be returned to the starting position
2 (however, the clock will continue to run).
- 3 • Each completed section of the ramp is worth points. A section is considered
4 complete when any part of the robots chassis passes over the scoring zone line
5 that defines the end of the section your robot is on, and the beginning of the next
6 section.
- 7 • If your robot is completely on top of the table, it earns 100 pts. (the robot must
8 have all its supporting components (Wheels, tracks, skids, etc) on the table to be
9 considered completely on the table).
- 10 • A member of the team will indicate to the Challenge Monitor when to stop the
11 clock at the conclusion of the run. **(CAUTION: DO NOT TOUCH THE ROBOT
12 UNTIL THE MONITOR INSTRUCTS YOU TO DO SO OR YOU COULD END UP
13 FORFEITING YOUR FLAG POINTS AND YOUR TIME BONUS).**
- 14 • The center of the flag (the flagpole) determines which scoring zone the flag is in.
15 If any part of the robot is touching the flag (Flag stand, flagpole, or flag) then a
16 penalty of 50% of the flag points will be assessed.
- 17 • If the robot successfully plants the flag (the flag must be standing upright on its
18 base) a time bonus equal to 1 pt for every remaining second will be added to the
19 overall score.

21 Challenge Track Specifications:

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- 23 • Event Directors are free to use locally available materials in the construction of
24 challenge tracks, but should make an effort to match as closely as possible to the
25 US standard.
- 26 • The table top is 60 cm x 80 cm and will be constructed of particle board.
- 27 • The table top surface will be *1 m* above the floor surface.
- 28 • The ramp is constructed of particle board and has a smooth flat surface.
- 29 • **ES Div:** The robot may start either on the floor, or on the beginning portion of the
30 ramp. (See diagram below).
- 31 • **MS, HS, & UP Div:** The robot starts behind the line 30cm from the base of the
32 ramp. (See diagram below).
- 33 • There will be four (*2 mm* wide) black lines drawn perpendicularly on the ramp at
34 the beginning, one third of the way up, two thirds of the way up, and at the top of
35 the ramp.
- 36 • There is a bulls eye centered on the table top consisting of a 3 black rings, please
37 see diagram below.

1 **Scoring Diagrams:**



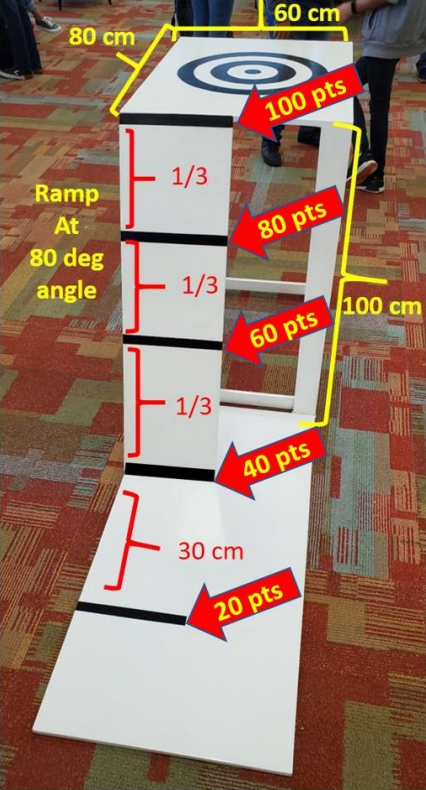
ES Scoring

The robot may start either in front of the 25 Pt line, or on the base of the Ramp. If the robot makes any movement at all even if unsuccessful it earns 25 points.

As it moves up the ramp, if any portion of the robot chassis crosses the next score line it earns those points.

If the robot in its entirety is resting on the top of the table, it earns 100 points

Diagram details: Ramp at 80 deg angle, 100 cm height, 60 cm top width, 80 cm top length. Score zones: 100 pts (top), 75 pts, 50 pts, 25 pts (bottom), 30 cm base.



MS, HS, & UP Scoring

The robot starts behind the 20 Pt line. If the robot moves at all, it earns 20 points.

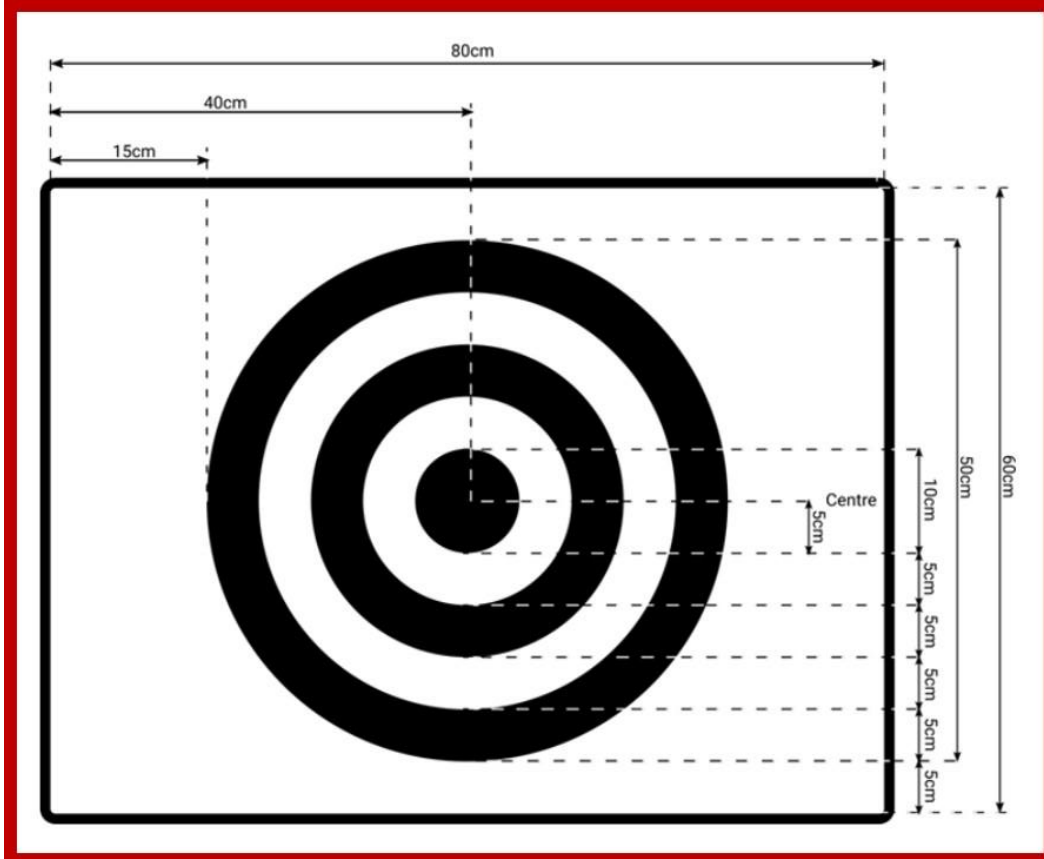
If the robot touches the ramp it earns the 40 Pts. As it moves up the ramp, if any portion of the robot chassis crosses the next score line it earns those points.

If the robot in its entirety is resting on the top of the table, it earns 100 points

Diagram details: Ramp at 80 deg angle, 100 cm height, 60 cm top width, 80 cm top length. Score zones: 100 pts (top), 80 pts, 60 pts, 40 pts, 20 pts (bottom), 30 cm base.

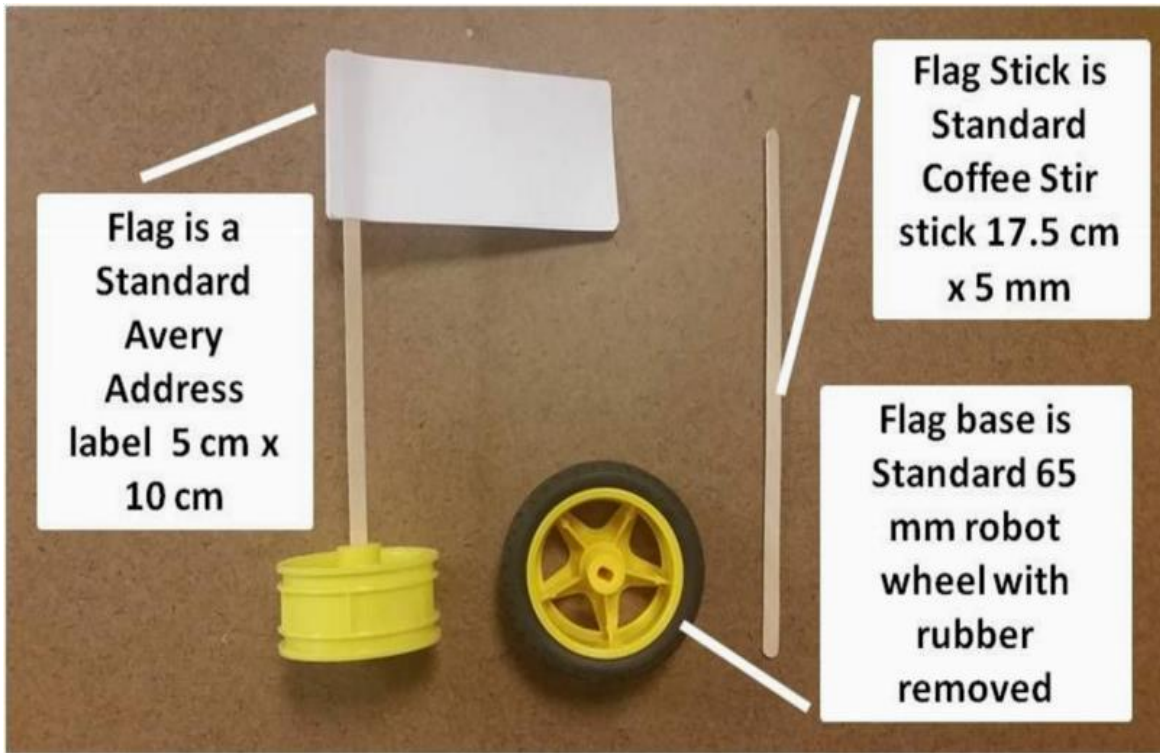
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Bulls Eye Diagram:



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1 **Flag Diagram:** There is a small flag with a round base with a 50 mm diameter that will
 2 be provided at the challenge (see diagram below).
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Scoring Matrix: Maximum Points possible = 300 + time bonus

Start Line & Ramp	MS Start	ES Start Base of Ramp	One-third	Two-thirds	Top of Ramp
ES	X	0/25	50	75	100
MS/HS/UP	0/20	40	60	80	100

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Table Top & Flag pts	Table top	Bulls Eye	Inner white	Inner Black	Outer White	Outer Black
ES	100	100*	80*	60*	40*	20*
MS/HS/UP	100	100*	80*	60*	40*	20*

*50% penalty if any part of flag-pole or flag base are touching the robot

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