

# SparkFun Autonomous Vehicle Competition 2017

## Speed Demons – Rules v1.0

### 1. Overview

- 1.1. For the eighth year in a row, SparkFun Electronics is proud to present our Autonomous Vehicle Competition!
- 1.2. Competing vehicles will be expected to complete a course littered with obstacles within a set time frame without human interaction.

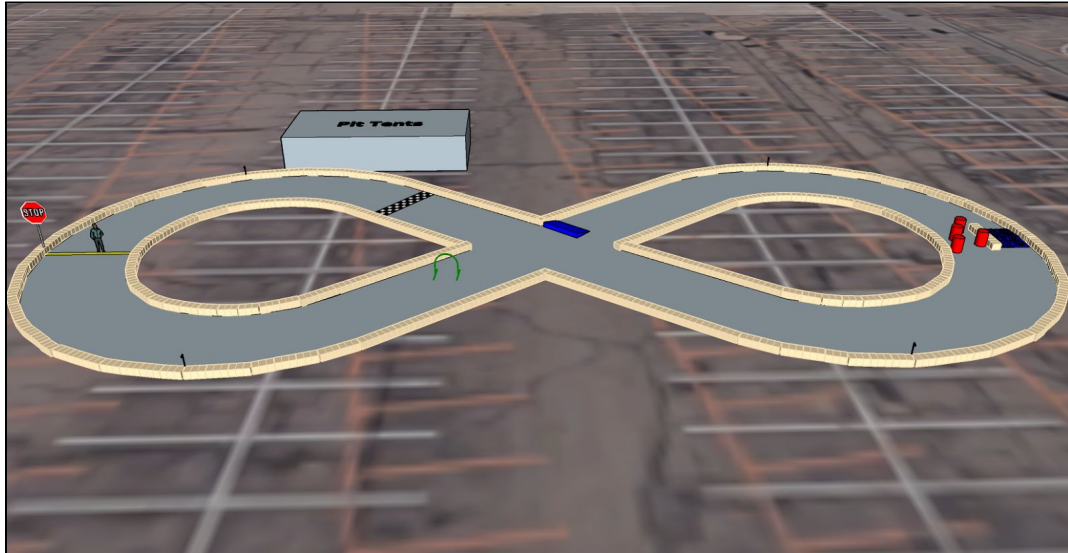


Figure 1. Course Overview

### 2. Track Information

- 2.1. The track is a figure-eight layout with a major axis length of approximately 178 feet and a minor axis of approximately 78 feet.
- 2.2. Track width is 16 feet.
- 2.3. Track extents are defined by hay bales.

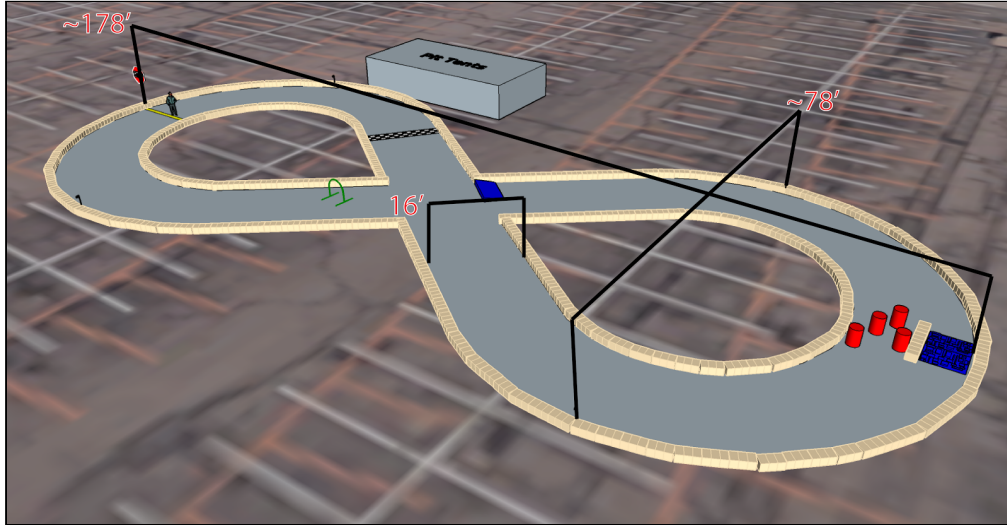


Figure 2. Course Dimensions

### 3. Vehicle Rules

- 3.1. All vehicles must weigh less than 25lbs.
- 3.2. No fixed beacons may be placed to aid in navigation. This includes, but is not limited to, DecaWave systems and RTK GPS systems.
- 3.3. Kill switches are not required but are encouraged, especially for larger robots.

### 4. Scoring

- 4.1. Time based: 300 points are granted with a one-point deduction per second required to complete the track.
- 4.2. Obstacle navigation:
  - 4.2.1. Barrels/Horizontal Climbing Wall (+20 points) – A section of the course will be obstructed by a dilemma, and the robot must select a path.
    - 4.2.1.1. Four red barrels are arranged such that no linear path exists through them without course correcting. Barrels may be rearranged between heats.
    - 4.2.1.2. A blue set of boards with attached blocks will obstruct one path. Vehicles must climb across the boards to clear the obstacle.

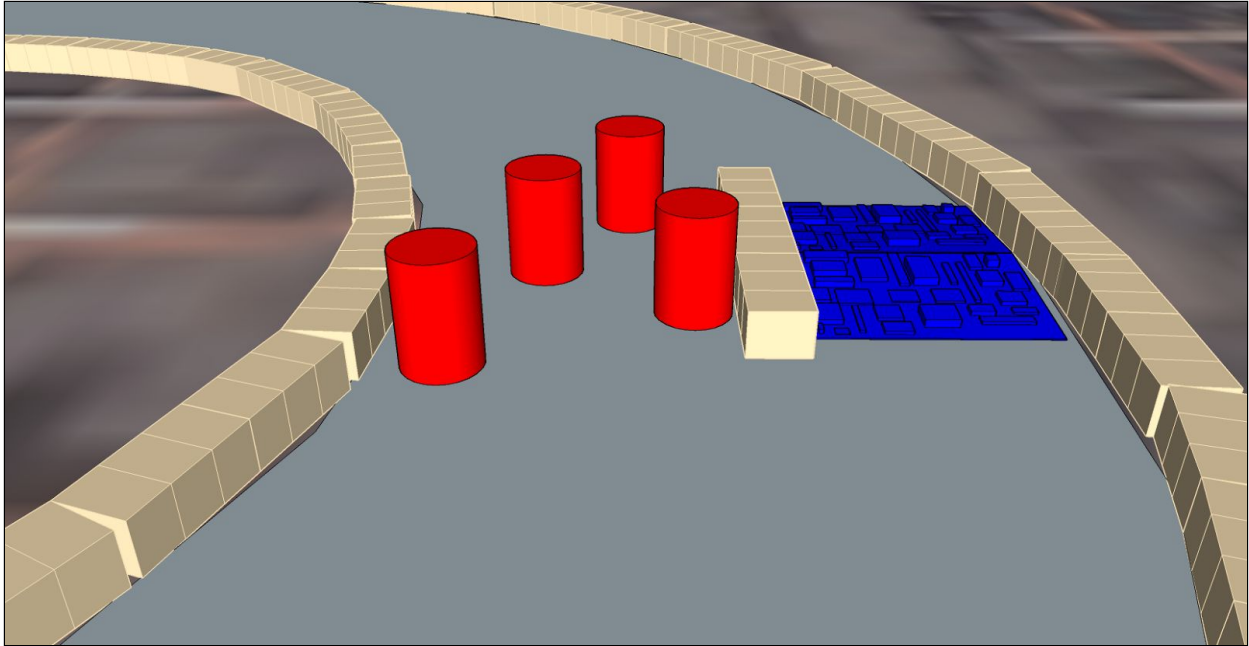


Figure 3. Barrel/Horizontal Climbing Wall Dilemma

- 4.2.2. Ramp (+20 points) – A blue ramp will be placed at some point in the course. Ramp bonus is granted if the entire vehicle leaves the ground at some point.
- 4.2.3. Hoop (+20 points) – A green hoop will be placed at some point in the course. Passing through the hoop earns a bonus to your score.

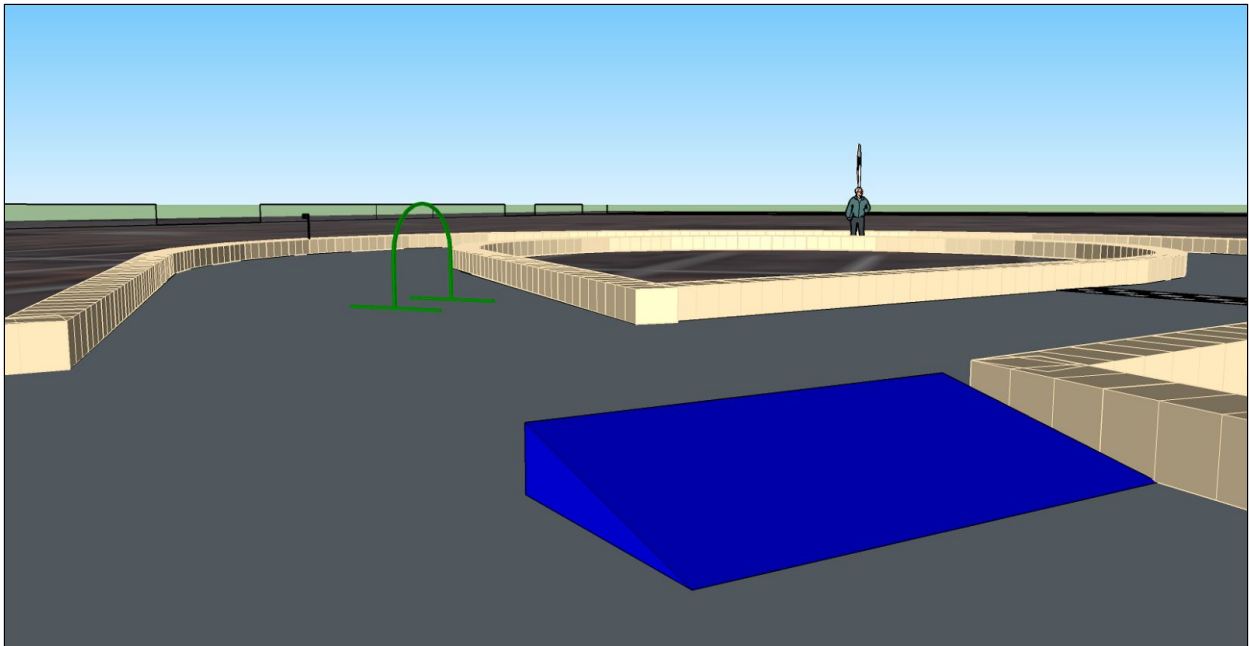


Figure 4. Ramp and Hoop Obstacles

- 4.2.4. Pedestrian/Stop Sign – A red "pedestrian" will be crossing the course at some point. Before the pedestrian, a "crosswalk" will be marked on the surface of the track. Vehicles stopping within a marked range at the crosswalk will receive the full stop bonus. The crosswalk will be a one-foot-wide stripe of yellow that spans the entire width of the track.
- 4.2.4.1. Full stop inside stop region (+20 points)
  - 4.2.4.2. Making it past the pedestrian with no collision (+20 points)
  - 4.2.4.3. Collision with pedestrian (-20 points)

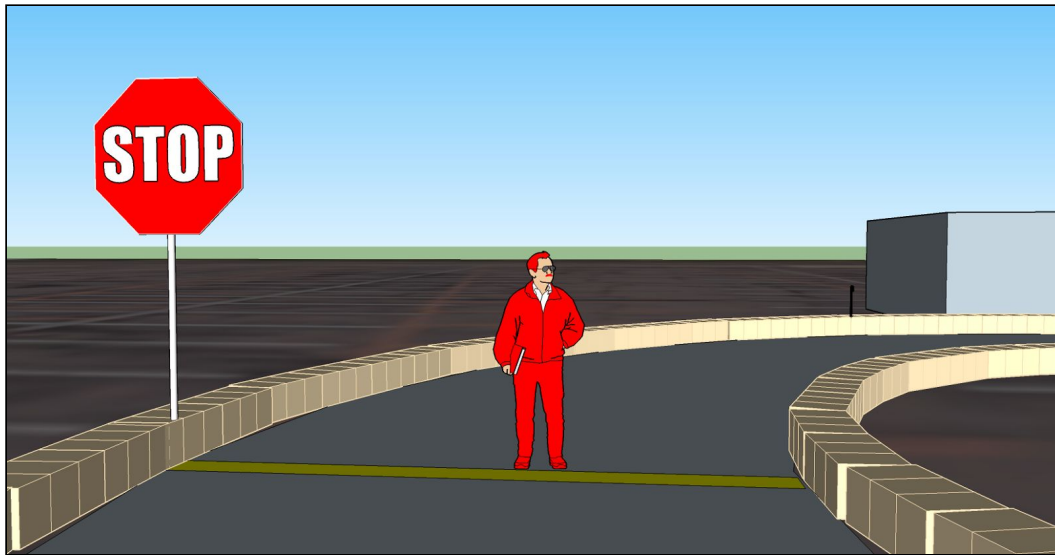


Figure 5. Pedestrian Crossing Obstacle (concept pedestrian shown)

- 4.3. Checkpoints (+5 points per checkpoint passed) – One checkpoint will be located at each of the four tangent points of the figure eight. Each checkpoint will be marked with a flag in the hay bale. No interaction is required from the robot; the vehicle must merely pass the checkpoint to be awarded points.

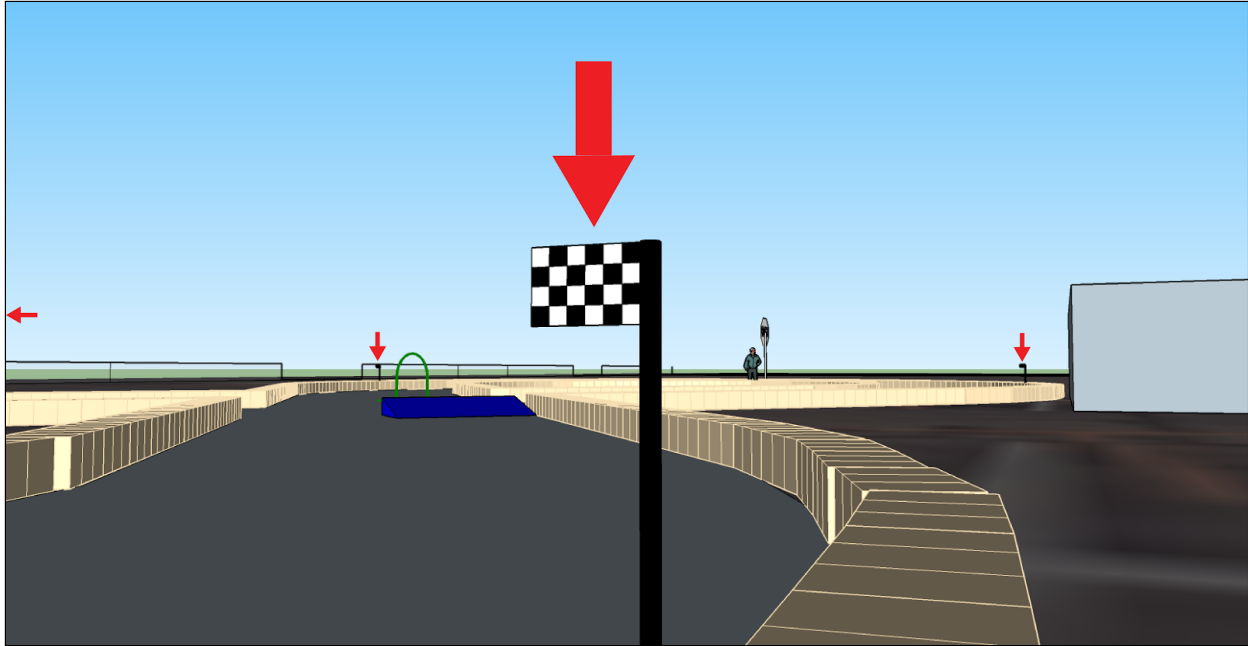


Figure 6. Checkpoint Flags

4.4. No GPS bonus (+150 points) – Each heat completed without the aid of GPS nets a point bonus.

## 5. Race Rules

5.1. Each competitor will have the opportunity to participate in up to three heats.

5.1.1. A heat will consist of no more than five competing vehicles at a time.

5.1.2. Each heat is limited to 10 minutes in length. Five minutes will be allotted between heats for competitors to set up. Competitors not at the starting line at the end of the five-minute setup time will be disqualified for that heat.

5.1.2.1. No makeup heats are allowed.

5.1.2.2. Teams are strongly encouraged to bring extra batteries to ensure that they are ready to go at heat start time.

5.1.3. A completed heat is one lap around the entire figure-eight course. Short cuts will result in disqualification with no points awarded for the heat.

5.2. A vehicle that leaves the course during a heat will be disqualified with no points awarded for the heat.

5.3. Scoring is totaled across heats.



