

# Grand Theft Autonomous 2021

The game has four players (robots) in two teams (2v2). Games last 3 minutes (this time may change). Robots are controlled remotely through the internet. Players can view their robot on only half the field (their half) through a webcam and zoom. Points are scored by spending time on the blind side and moving cans to locations on their side of the field. Teams with the most points at the end of the game wins.

## Rules:

1. Robot Constraints
  - a. Robots must fit in 12" x 12" x 12" box to start
  - b. Robots are controlled via internet through one unique URL via ngrok
  - c. Robots can have a maximum of 10Kbytes/sec data transmission each way
  - d. Robots should not physically damage other robots or field
  - e. Robots should not intentionally disrupt sensing or communication of other robots.
2. Objectives
  - a. Score as many points as possible to win game
    - i. Maximum possible score **from time points and object points**
  - b. Scoring methods
    - i. Time in scoring zone on blind side - 1 point per second for each robot
      1. Each second entire robot is past scoring line on blind side
    - ii. At end of game objects in scoring zones on player's side
      1. 50 points for each can on player side
      2. 200 points for **each beacon** on player's side
      3. Object points doubled if inside middle circle **on player's side**

### Rule interpretation - Things explicitly allowed:

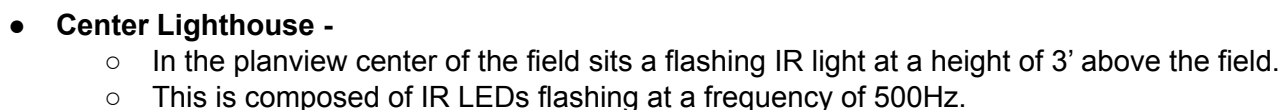
1. Robot to robot contact is expected and allowed. Robots should be made robustly with this in mind.
2. Robots may throw cans
3. Robots may "unfold" or go beyond the initial 12x12x12 size limitation.
4. Robots may separate parts of themselves, but all starting items are considered to be part of the robot. When determining time points, any portion of the robot (left behind or not) not past the scoring line will count as not being entirely in the time scoring zone.
5. Maximum possible score for one team is **1960 points (360 time score + 2\*(200 red beacon + 200 blue beacon + 8\*50 can score))**

### Rule interpretation - Things explicitly disallowed:

6. No intentional flipping of robots
7. No dispensing of liquids or flames
8. No midgame repairs will be allowed. Repairs can happen after games are finished. If a robot is damaged due to intentional action from another robot, a rematch will be called and the offending robot removed from play.

11. Any cans or beacons knocked over will be returned to the upright position by game judges
12. Any robots that are knocked over will be returned to the upright position by game judges
13. Any cans or beacons that end up outside of the field of play will be returned to the field of play by the judges to the nearest point on the field.

The field is 12FT x 5FT. bounded by 2 by 4 bars acting as walls (mostly) there are a few spots where cardboard covers gaps. There are two sides identified for each team. A red side and blue side. Each team starts on its color side and has near real-time remote vision (webcam through zoom) of their own side. The opposing side cannot be viewed. Lines on the field delimit zones that affect scoring. Initial positions of robots and cans are shown in the Game Field figure below.



- It sits on an unmovable square base 6" x 6".
- **Scoring Cans -**
  - Eight soda cans are distributed around the field 4 on each side.
  - Cans start on the perimeter of the field (shown as filled gray circles in the figure)
  - The cans are empty soda cans with 6 quarters taped to the bottom and 7 quarters distributed around the bottom rim. This weight distribution tends to make the cans stand upright under all conditions.
  - The cans will be wrapped in foil that enhances conductivity.
- **Beacons -**
  - Each team has a beacon on their side.
  - Each beacon starts at 1FT away from the rear wall centered on the field (shown as filled yellow circles on each side).
  - Each beacon has an IR light that sits at a height 12" above the floor of the field.
  - The Red side beacon flashes at 200Hz, The Blue side beacon flashes at 300Hz
  - The beacons are mounted on scoring cans (described above) with additional mass from batteries.

**ALL RULES AND THE FIELD ARE SUBJECT TO CHANGE.**  
**Amendments will be posted in a single post on Piazza.**