

2015 Southern California

# Tote Bot Races



## Competition Rules

Hosted by:

**Team 4276**

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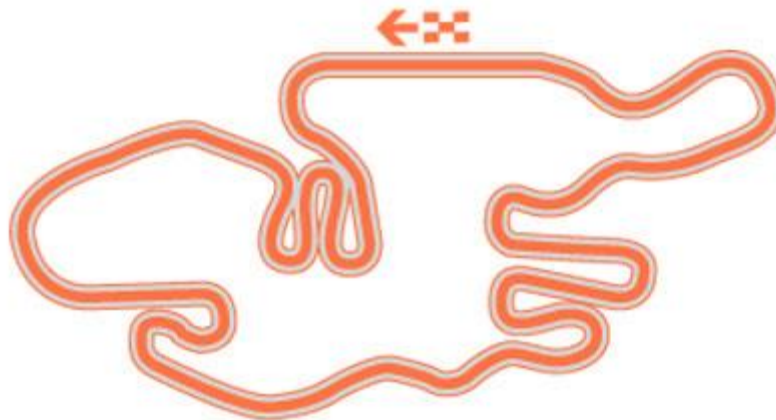


# 2015 Tote Bot Competition

## 1.0 The Game

- 1.1 The 2015 Tote Bot Competition (known hereafter as the “COMPETITION”) consists of rally car and time trial style racing events. Competition teams compete with a single TOTEBOT in order to achieve the lowest course completion time.
- 1.2 The 2015 Totebot Race Course (known hereafter as the “COURSE”) consists of an asymmetric circuit with cones and/or other nondestructive barriers defining the course perimeter and sidelines. ***Note: Details of the course setup will not be revealed until days leading up to the race. TOTEBOTS must be designed to handle COURSE parameters of any shape assuming the constraints in this section.***

**Figure 1: Example of an asymmetrical (non-oval) “circuit” track. Note this is NOT the shape of the 2015 COMPETITION track.**



- 1.2.1 The COURSE maintains a minimum width of ten (10) feet and may contain turns of up to 180 degrees with a turning radius of at least 15 feet (outside barrier)
- 1.2.2 The COURSE consists of parking lot blacktop concrete of medium to heavy coarseness. Although the COURSE is generally level, cracks in concrete or drainage dips not to exceed 1.5” in depth may exist in multiple locations.

- 1.2.3 The COURSE length is designed not to exceed 2,500 feet in distance. The COMPETITION host may direct racing of multiple laps to achieve the total desired COURSE length.
- 1.2.4 The distance from the drivers station to the farthest point on the COURSE will not exceed 100 feet line-of-sight to ensure radio connectivity.

### 1.3 Individual Time Trial Event

- 1.3.1 TOTELOTS will start each race upon referee declaration.  
TOTELOTS must start behind a marked starting line and may not cross the line until the referee has declared race start.
  - 1.3.1.1 Early line crossing will be declared as a “false start” and require the competing team to reset their position for a restart. Repeated or intentional violations of this rule will result in a 10 second penalty in addition to the position reset.
- 1.3.2 TOTELOTS will drive through the COURSE individually until the marked and designated finish line is crossed. Robots are ranked in order of fastest completion time.
  - 1.3.2.1 Failure to cross the finish line results in complete disqualification of the run
  - 1.3.2.2 After declaration of race start, TOTELOTS must not be touched by teams or equipment throughout the race. Doing so applies a time penalty for each team interaction.
    - 1.3.2.2.1 If a TOTELOT is stuck/disabled or leaves the COURSE, a team member may handle and/or relocate the TOTELOT to the point within the COURSE at which it left or became stuck. In this situation, a team member may realign their TOTELOT to their choosing. For each occurrence, a **5 second** penalty will apply in addition to time spent replacing the TOTELOT.
    - 1.3.2.2.2 Intentional or repeated attempts to exit the COURSE (ie take shortcuts) will result in a **10 second** penalty and require replacement on

the COURSE at the location of exit. This penalty is judged by perceived intent and will not be applied to multiple accidental COURSE exits.

## **1.4 Rally-Style Event**

1.4.1 Up to four (4) TOTELOTS will line up before the COURSE starting line and will start each race upon referee declaration.

1.4.1.1 Early line crossing will be declared as a “false start” and require all competing team to reset their position for a restart. Repeated or intentional violations of this rule will result in a 10 second penalty in addition to the position reset.

1.4.2 All TOTELOTS will drive through the COURSE until the marked and designated finish line is crossed. Robots are ranked in order of race completion time (after applying time penalties, if applicable).

1.4.2.1 Failure to cross the finish line results in complete disqualification of the run

1.4.2.2 After declaration of race start, TOTELOTS must not be touched by teams or equipment throughout the race. Doing so applies a time penalty for each team interaction.

1.4.2.2.1 If a TOTELOT is stuck/disabled or leaves the COURSE, a team member may handle and/or relocate the TOTELOT to the point within the COURSE at which it left or became stuck **only if they may do so safely** (ie no oncoming TOTELOTS may interfere with the placement). In this situation, a team member may realign their TOTELOT to their choosing. For each occurrence, a **5 second** penalty will apply in addition to time spent replacing the TOTELOT.

1.4.2.2.2 A referee may declare a “Red Flag” situation at any time continuing the race is deemed unsafe. This includes COURSE obstruction/damage, replacement of multiple robots to the COURSE,

weather issues, communications issues, etc. In a “Red Flag” situation, all driver must let go of their controls immediately, and upon additional request may be required to E-Stop disable their TOTELOTS.

1.4.2.3 TOTELOTS may not intentionally contact other robots within their race. Doing so may incur a **5 second** penalty for minor offenses, up to **30 second** penalty for moderate offenses, or disqualification for major offenses (as judged by a referee).

1.4.2.3.1 It is expected that some occasional incidental contact will occur. This rule is in place to protect teams from intentional collision for the purposes of disabling, damaging, or running TOTELOTS off the course. Low-impact bumping will generally not fall under this category, but intentional and/or violent maneuvers (such as PIT maneuvers) may be regarded as major offenses.

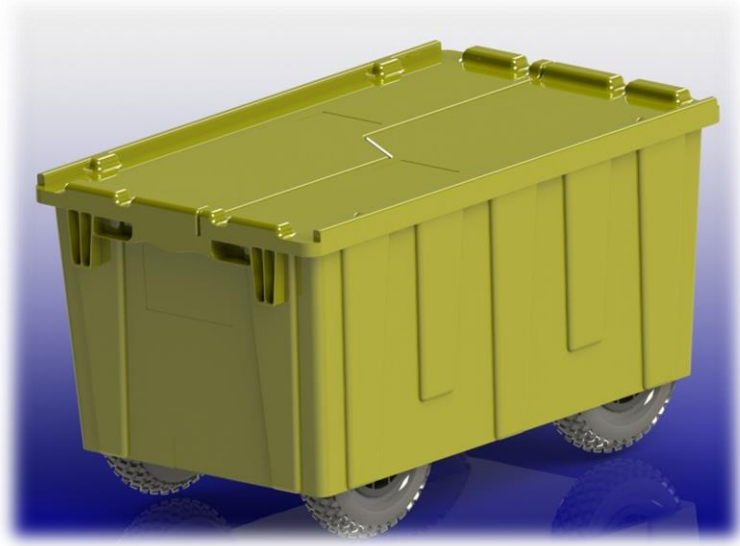
1.5 A DRIVE TEAM consists of up to two (2) students handling robot controls and up to four (4) human players stationed around the perimeter of the TRACK within designated “safe zones”.

1.5.1 Human players may only leave the “safe zones” when it becomes necessary to handle their robot (due to departure of the COURSE, replacement of a stuck/disabled ROBOT, etc). Violation of this policy results in a 5 second penalty for each occurrence

## **2.0 The TOTELOT**

2.1 The 2015 COMPETITION TOTELOT consists of one (1) self-powered, remote controlled robot per team.

**Figure 2: Example TOTEBOT with wheels legally extended below bottom of TOTE.**



- 2.2 The TOTEBOT must use an official 2015 FIRST Robotic Competition TOTE game piece as its outer shell with no modifications\* to its sides or top.
  - 2.2.1 Both GRAY and YELLOW TOTES are acceptable, but teams may not use non-official TOTES such as those part of the 2014 or earlier Kit of Parts (KoP)
  - 2.2.2 \*The only permissible modifications to the sides and top of the TOTE are as follows:
    - 2.2.2.1 Up to four (4) holes no greater than 1 inch in diameter (for purposes of vision/camera systems, air cooling, radio signal improvement, etc)
    - 2.2.2.2 Unlimited holes up to 3/8" diameter for purposes of mounting bolts, rivets, etc to the inside of the TOTE
    - 2.2.2.3 Extrusions not to exceed 0.5" (bolt heads, camera lens, sensors, etc)
    - 2.2.2.4 One Robot Signal Light, the 120 amp breaker switch, and other human safety devices may extrude from the top of the TOTEBOT if desired
    - 2.2.2.5 Aesthetic modifications that include painting, addition of stickers, team/sponsor logos, and team numbers are permissible. These modifications may not change the external aerodynamic shape of the TOTE (ie no spoilers, fins, or drag reduction devices)

- 2.2.3 An unlimited amount of modification may be done to the bottom surface of the tote, including holes or larger removal of TOTE body.
  - 2.2.3.1 TOTEBOT parts may not extrude beyond original surface location of TOTE body beyond three (3) inches in height, and may not extrude beyond the TOTEBOT perimeter at any length (this includes wheels) throughout the entire race.
- 2.3 TOTEBOTS must be controlled using a FIRST Robotics Competition controller (2015 roboRio or 2009-2014 cRio) and must connect to FIRST approved Driver Station software.
  - 2.3.1 Although software from any year (2009-2014) is acceptable for usage depending on the age of available hardware, the software versions of both the Driver Station and cRio/roboRio must be the latest available for that competition year (ie no “beta” or non-competition versions of software permitted).
  - 2.3.2 All Driver Station components must be deemed FRC-legal (follow 2015 Driver Station Rules)
  - 2.3.3 All TOTEBOTS will be controlled through individual team wireless routers, as no Field Management System will be available. TOTEBOTS must connect to their individual wireless network IDs and should keep their radios in “AP Mode”. No team is permitted to connect to another team’s network ID for any reason.
    - 2.3.3.1 Teams intentionally attempting to degrade or disrupt another team’s wireless communications will immediately be disqualified
- 2.4 TOTEBOTS must follow all **FRC 2015 Competition Rules** regarding legal motors, speed controllers, pneumatic devices/limitations, minimum wire gauge, general wiring constraints (ie 1 motor per speed controller), batteries, power distribution panels, etc
  - 2.4.1 If a 2009-2014 FRC controller is in usage, power distribution/digital sidecar rules shall be followed from the competition year from which the cRio is sourced.

2.4.2 Only **one** (1) FRC-legal battery is approved for usage at a time within a TOTEBOT.

2.5 TOTELOTS must follow standard FRC weight restrictions of 120 lbs excluding battery weight.