Kickoff Day Robot Design Ideas

Expandable Launch Chute (can reach out 14” past robot perimeter, and will rest about 2” above the level of the middle row rim. It will actually reach to about an inch or two away from the rim (limited by the bottom “Fender” that is below the baskets).

A ball “bin” that holds at least 3 balls. Balls enter the bin from the ball collector (see below) and also can be tossed in by other robots or the inbounder.

* The ball “bin” has an optional “lid” that can close so that once 3 balls are controlled by the robot, no more can enter.
* The ball “bin” has a trap door that allows balls in the bin to be dropped out near the bottom of the robot; this allows the robot to function as a “feeder” for balls to another scoring robot.

A Ball “collector” (“vacuum”) which can easily, reliably and quickly scoop balls off of the floor and into the ball bin.

* The ball collector can reverse its spinning motor once the ball bin is full, so that it won’t accidentally collect additional balls, which will result in a foul.

A camera looking down low at the area near the ball collector, to aid drivers who are trying to collect balls that they cannot directly see from the driver station.

A Teflon plate underneath the robot and angled upwards from the central region to the front region of the robot – to allow the robot to cross the barrier, by lifting up the front end a bit until the front wheel can gain traction on the barrier sufficiently to propel the robot over the barrier.

Mecanum wheels, which enable rotation on the bridge, enabling 3 robots to fit on the bridge. These wheels will work well on the carpet. [Note: there may be some issues w/the wheels not having sufficient traction on the key area, which is build from HDPE.]

Gyroscope-aided balancing, with additional indication of “off-horizontal” angle which can be displayed in the driver station.

Kinect for helping the robot be targeted during Hybrid mode. [NOTE: this may not always be available to our team, if one of the other teams on our alliance is using it.]

Detector for “touched fender” detection, so the dunking robot knows when it is at the fender.

Game Strategy:

1. Ball Herding Strategy. Everyone is assuming there are 18 balls. Robots can hold 3, and the Inbounder can hold onto 2 (indefinitely, it appears). This means in theory that a team could go w/a strategy where they hoard all the balls:
   1. Defensive, Feeder and Scorer Robots hold 3
   2. Inbounder holds 2
   3. The team pushes the remaining balls into their "alley", where they position the defensive robot so that the other team can't get near them.
   4. Any balls the team can’t control should get pushed underneath the bridges to make it harder for the other team to gather them.

In theory, one team could completely freeze the other from scoring.

Design as of Sunday:

* Battery track, movable for balance need to stick, gear track?
* Ball intake (1) on long side of robot (cutaway)
* Rect. w/cutaway (rect) same dim or short?
* Frame perim 38”max us 20+bum?
* 22 in inside bump on long side not cut
* CONCERN tipping with small wheelbase?
* Wheels – mecanum, afford 10”? need for all robots. Have 8” and 6” available, 8” on robots
* Shooting:
  + Turret - rotating
  + Computer controlled targeting
  + Camera in line with turret, gyro, accelmtr?
  + Highspeed cannon rotating wheels to shoot
  + Need pushbutton shooting (driver triggered)
  + Ball storage/bin/hopper
  + Total 3 ball capacity, stores from floor and hopper
  + Prevents overcapacity balls
* Bumpers – 5-9” from floor?
  + Could be lower, 2-6/3-7/4-8
* Buttons for specific tuning on balancer – separate joystick or control box
  + 30rpm left,right
  + Turn
  + Fwd,rev
* NEED TO INVENTORY JOYSTICKS AND LABEL
* Camera at 50” high (note this may have changed if we revert to “dunker” strategy)

Note: As of Sunday evening, the original “dunker” strategy was appearing to be the preferred choice due to analysis of the complexity of building the full turret/shooting system. The precision required to achieve high-accuracy distance shooting was judged (a) not worth the risk of having a non-functional robot and (b) not necessarily going to guarantee a higher scoring robot than the dunker. The dunker will be "steerable" via a set of steering cables, and will also have a camera so that the robot can auto-score in autonomous mode.

Another idea was to ensure the hopper was at a level which would ensure easy loading from the inbounding “slot”.

Finally, a dual-wedge, under-carriage design was developed for providing a way to get over the barrier.

Also, the chassis must be mounted at least 4 inches above the floor, to provide clearance for the barrier.