

# 2013 *FIRST* Competition



Tournament Overview

Match Format

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Safety

Scoring

Fouls

The Arena

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Discussion

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# Tournament Overview

- Game played on a flat 27 X 54 foot field.
- Two 3-team alliances, one red and one blue, compete in each MATCH.
- Object is to attain a higher score than your opponent.

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# Tournament Overview

- **Tournament Format**
  - **Practice Matches**
    - To practice or run your robot on the field prior to qualification matches
  - **Qualification Matches**
    - Earn seeding position that may qualify you for Elimination Matches
  - **Elimination Matches**
    - Determine the Champions

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# Tournament Overview

- Qualification Score (QS)
  - Each team on the winning alliance receives 2 qualification points
  - Each team on the losing alliance receives 0 qualification points
  - In event of a tie, each team receives 1 qualification point
  - If disqualified or a no show, team receives 0 points

# Seeding

- All teams seeded during qualification matches.
- Teams ranked in this order:

Order	Points
1	Qualification score
2	Cumulative sum of auto goal points
3	Cumulative sum of climb points
4	Cumulative sum of teleop goal points and foul points
5	Random sorting by the FMS

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# Definitions

- Alliance: Set of three FRC teams that work together (assigned either red or blue color)

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# Definitions

- Team positions:
  - COACH: Student or adult mentor designated as the team coach and advisor during the match (1)
  - DRIVER: Pre-college student (2)
  - FEEDER: Pre-college student responsible for entering DISCS onto the Court

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# Safety

- All competition attendees must wear safety glasses while in the Arena
- Radio control mode of Robot operation is not permitted in areas anywhere outside the Arena or practice field. Robots must only be operated by tether when not within the Arena or practice field.
- Teams must pass inspection



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# Safety

- Any ROBOT in violation of a Robot Rule will automatically be assigned a PENALTY and may receive a Yellow Card, depending on the severity of the infraction

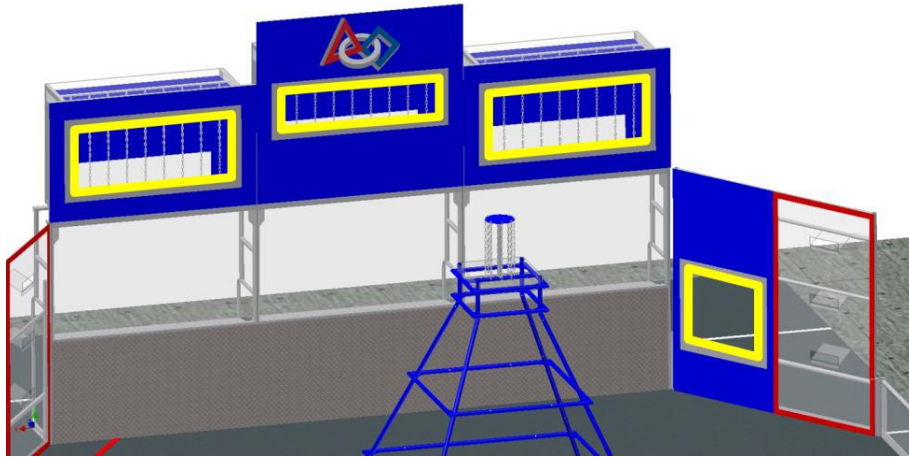
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# Scoring

## ■ DISC Points

- DISC is scored if any part of the DISC has crossed the opening of the Goal and in the Goal at the end of the Match and not in contact with robot
- For DISC to be considered scored in alliance pyramid goal, it must correspond to the pyramid color

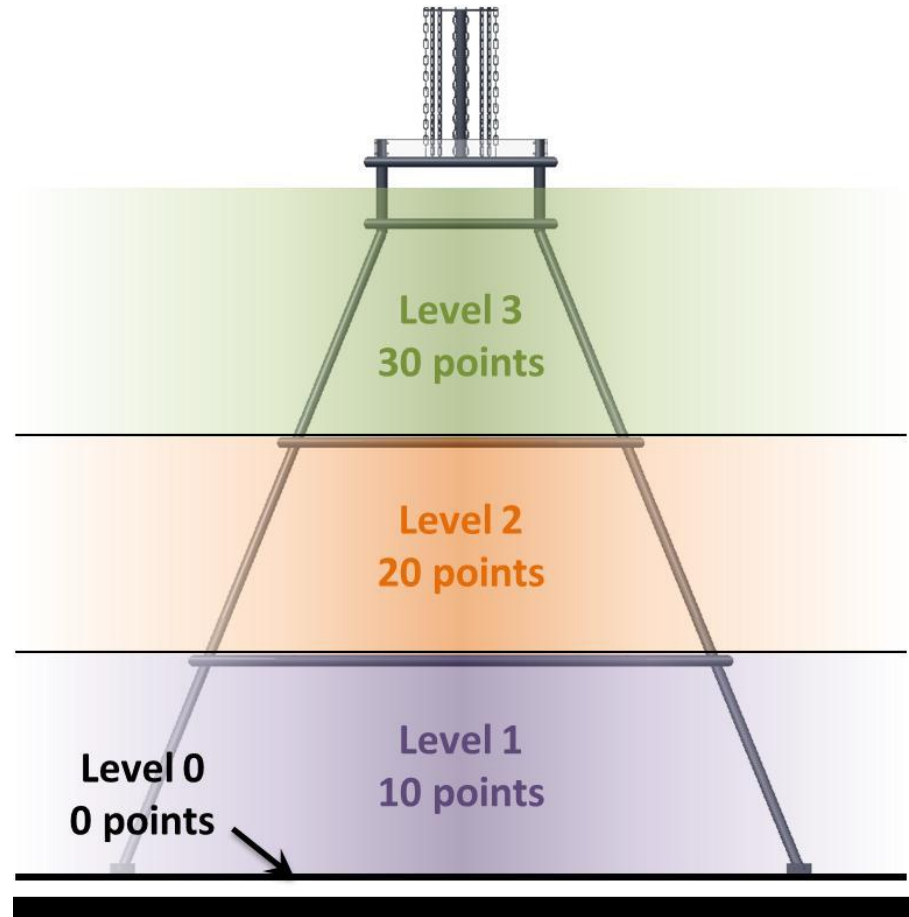
# Scoring – DISC Points



	Auto	Teleop
Low goal	2	1
Middle Goal	4	2
High Goal	6	3
Pyramid Goal	NA	5

# Scoring – CLIMB Points

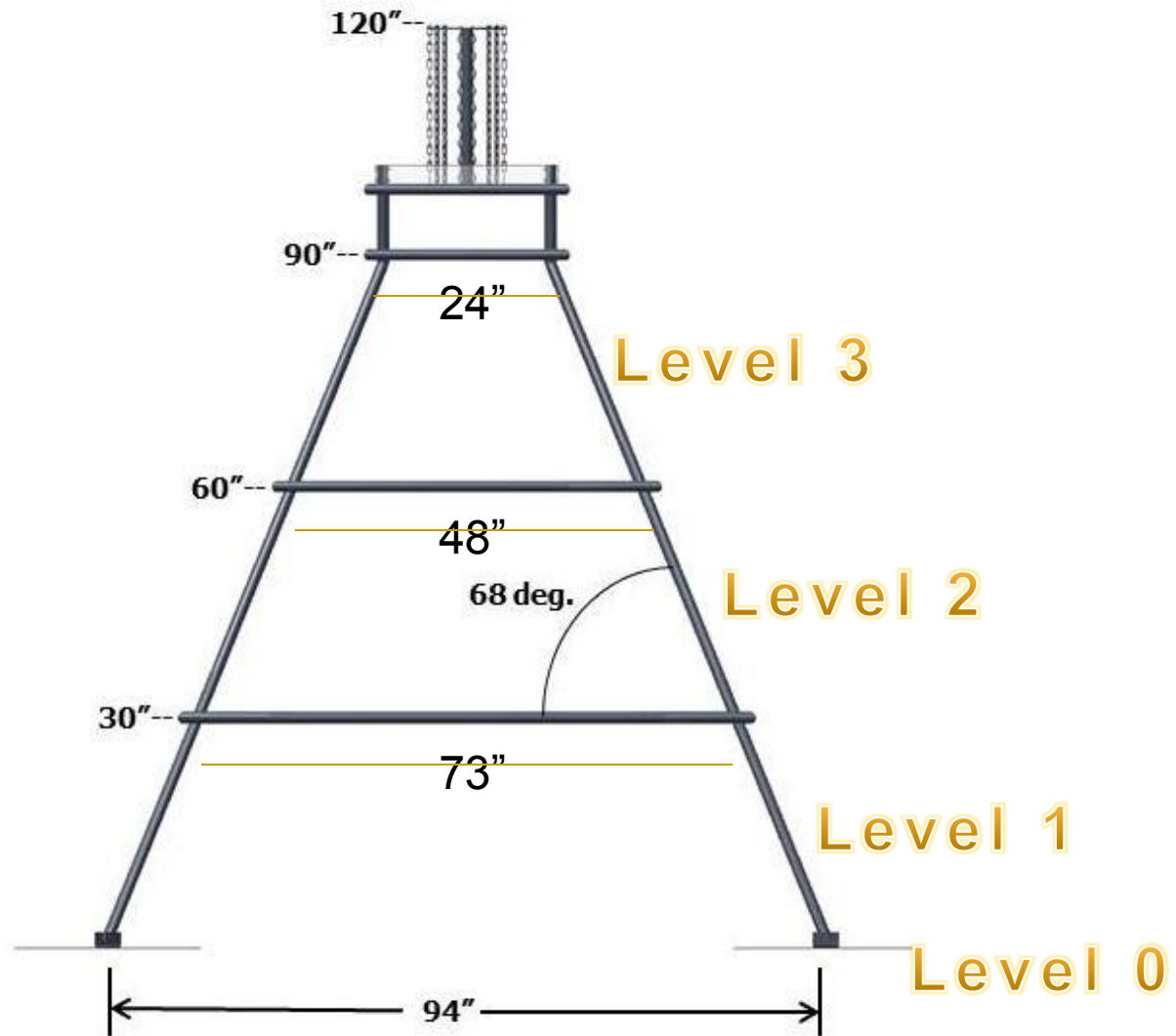
- Points are awarded for the highest level achieved determined by the lowest point of the robot, (in relation to the Field)



# Scoring – CLIMB Points

- A robot has climbed the pyramid if it **contacts** the pyramid in
  - A. Sequential order (level 0, 1, 2, 3) during ascent and
  - B. No more than 2 levels simultaneously
    - If a climb is unacceptable, the robot will be ineligible for climb points unless and until it begins a new climb from the floor, level 0

# Pyramids



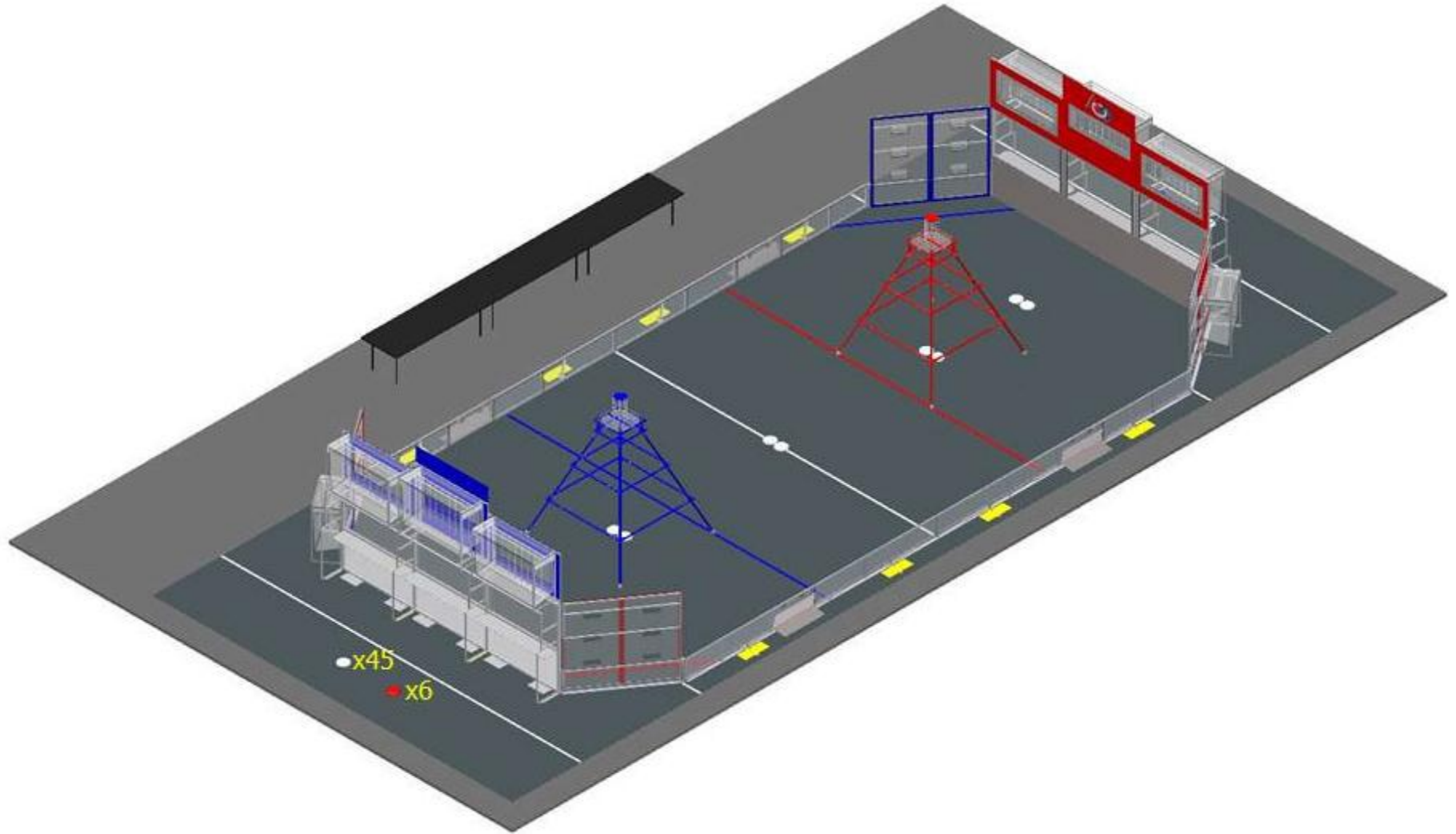
# Scoring – Penalty Assignment

- Upon a rule violation, FOUL or TECHNICAL FOUL points will immediately be credited to the opposing Alliance

## Table 3-1: Penalty Point Values

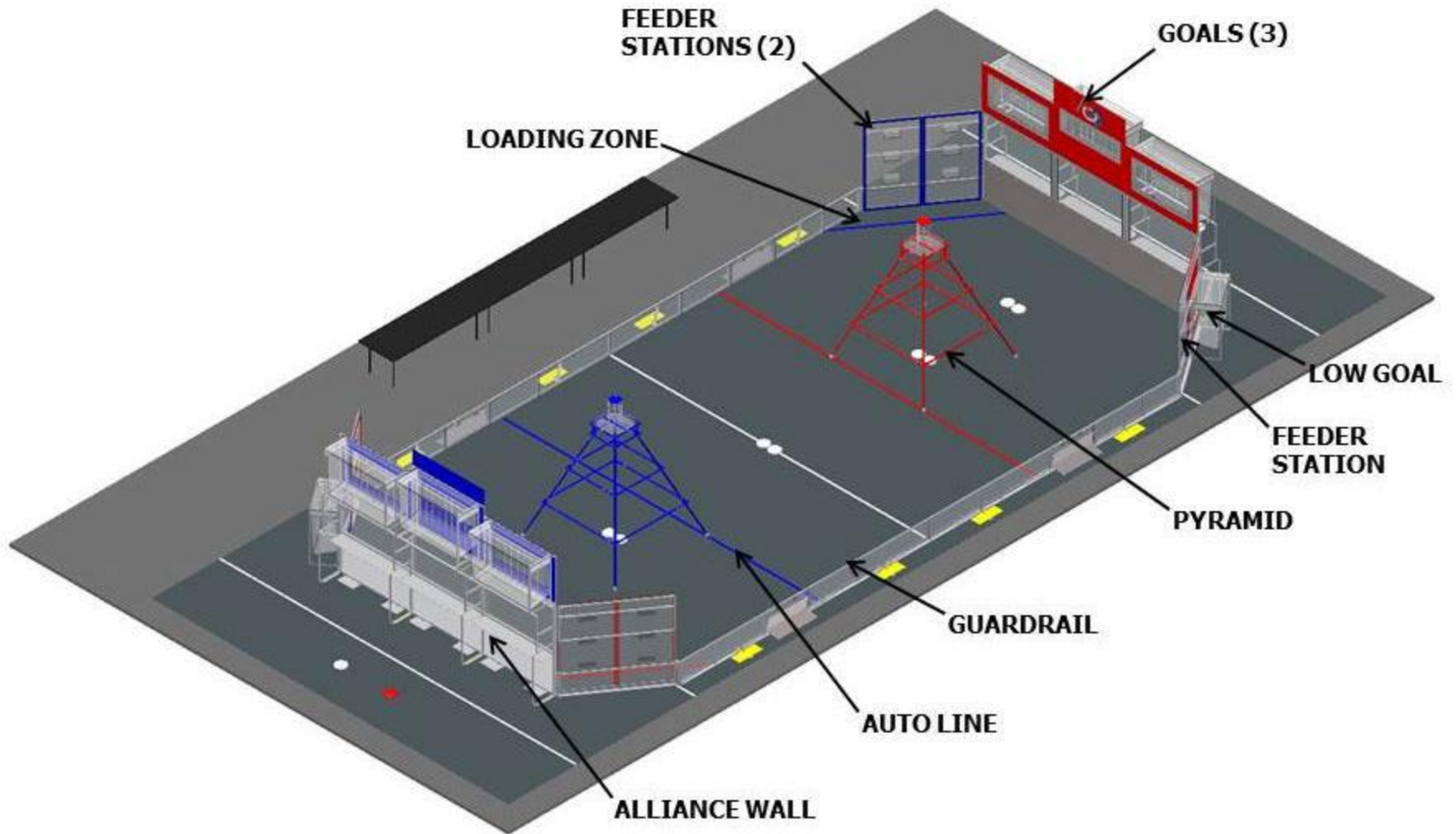
FOUL	3
TECHNICAL FOUL	20

# The Arena

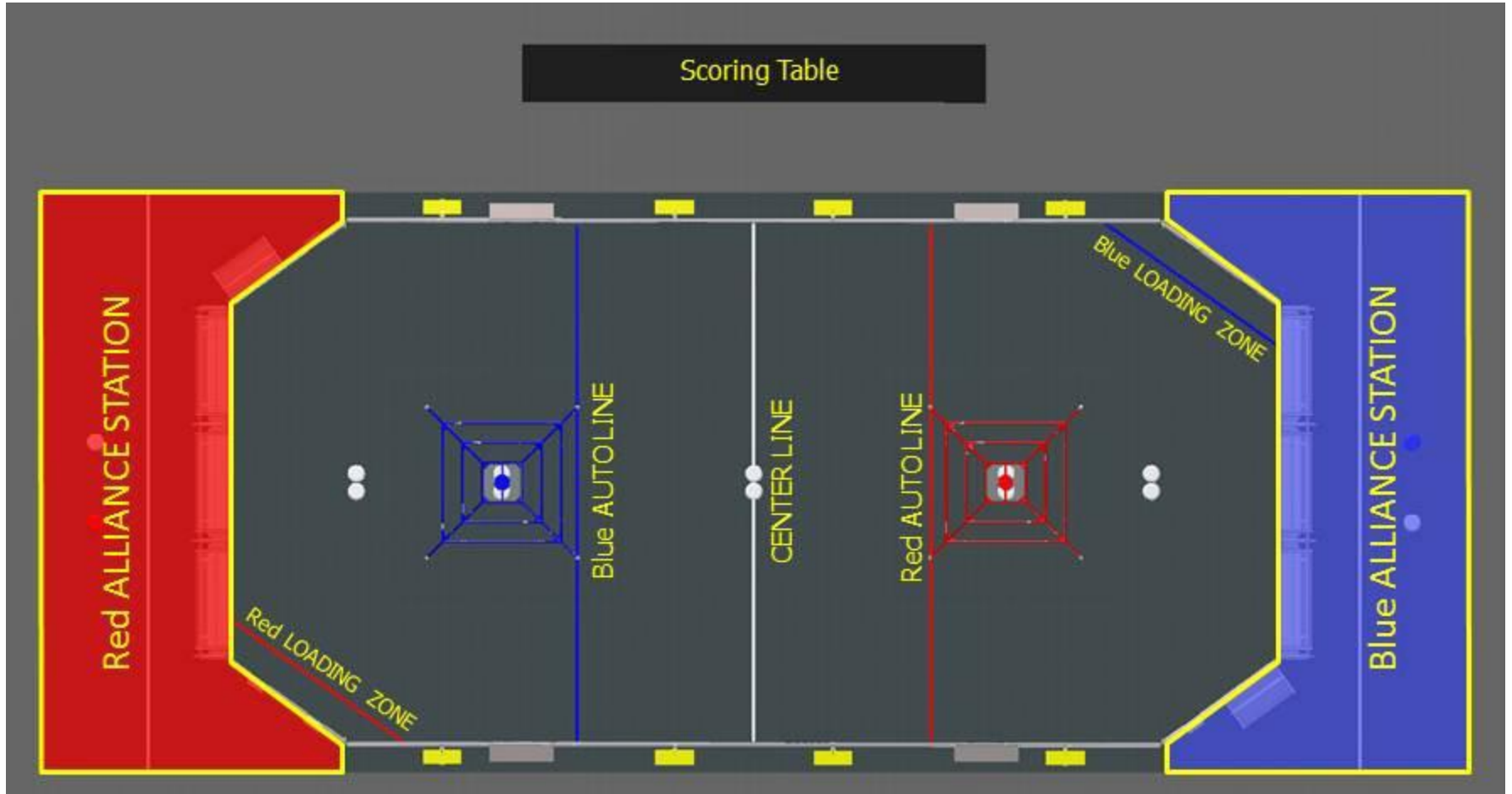




# Basic Field Layout



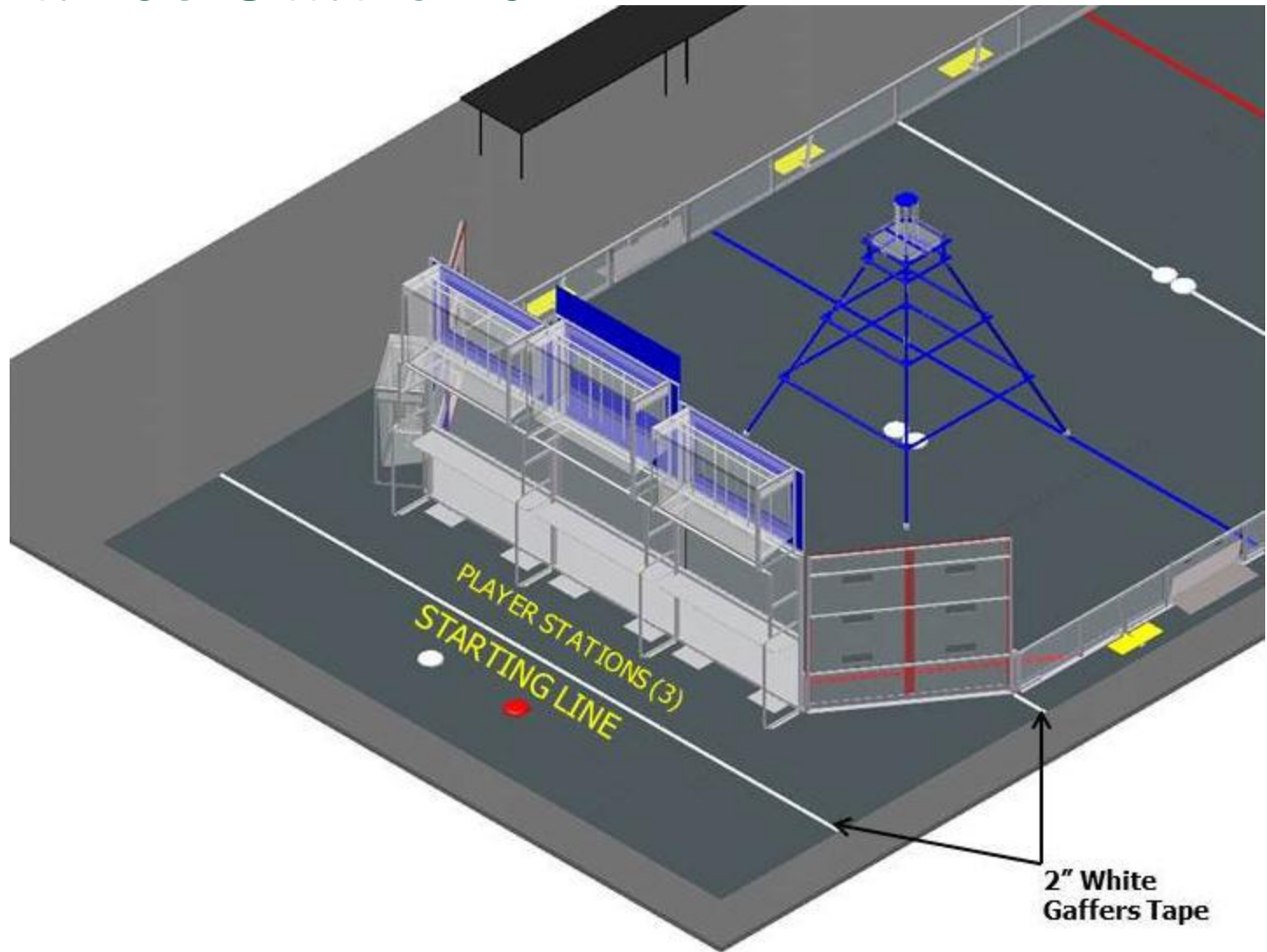
# Field Markings



# Goals

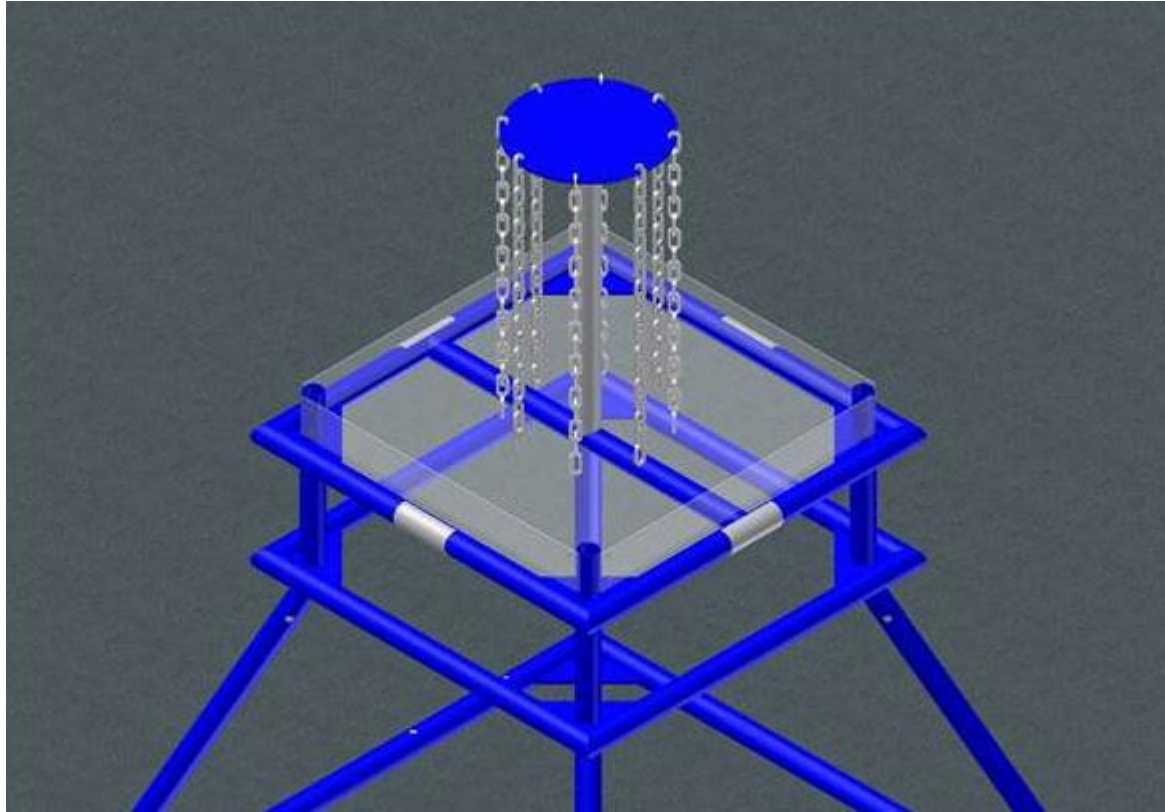


# Alliance Stations



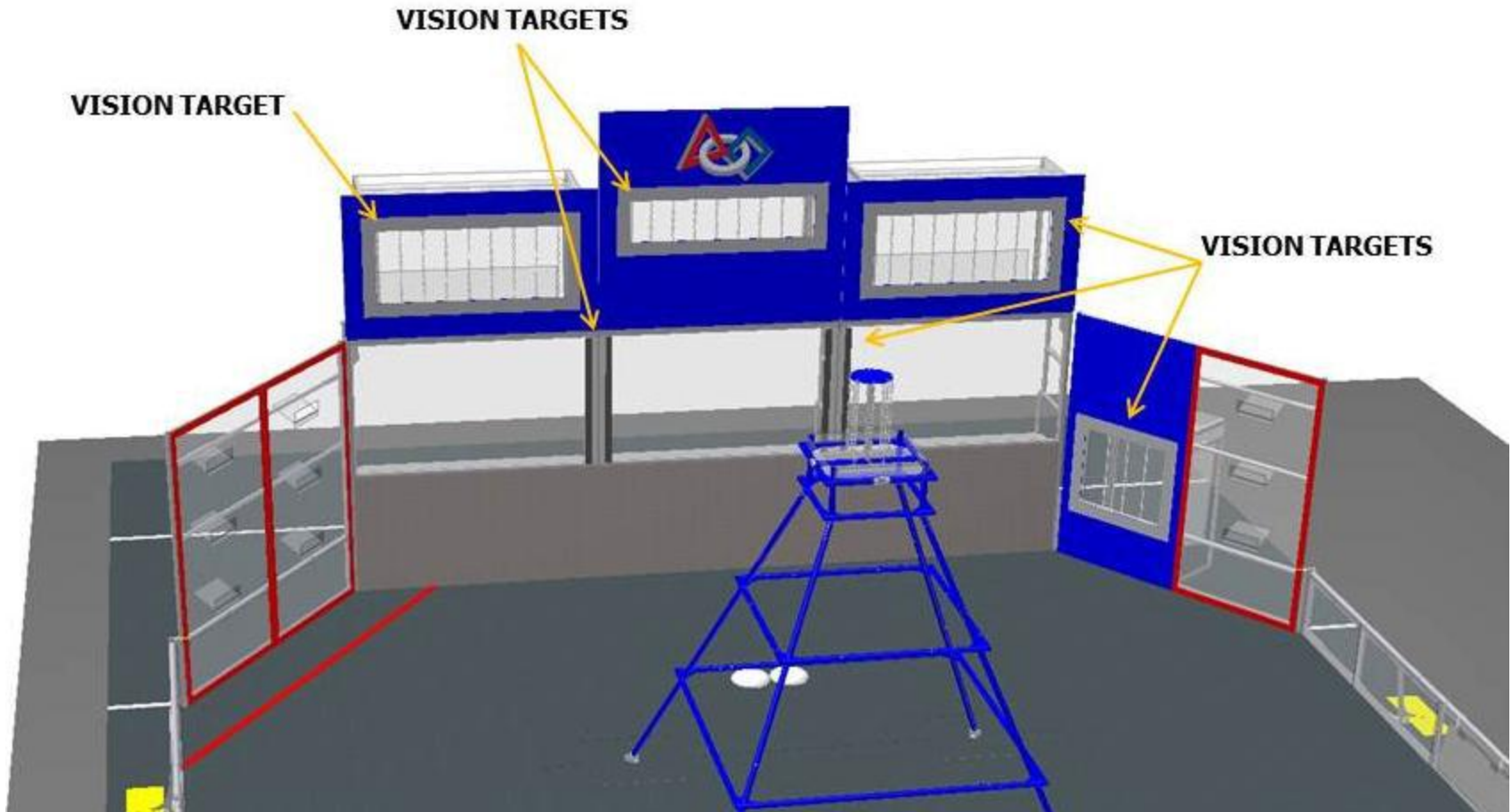
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# Pyramid Goal

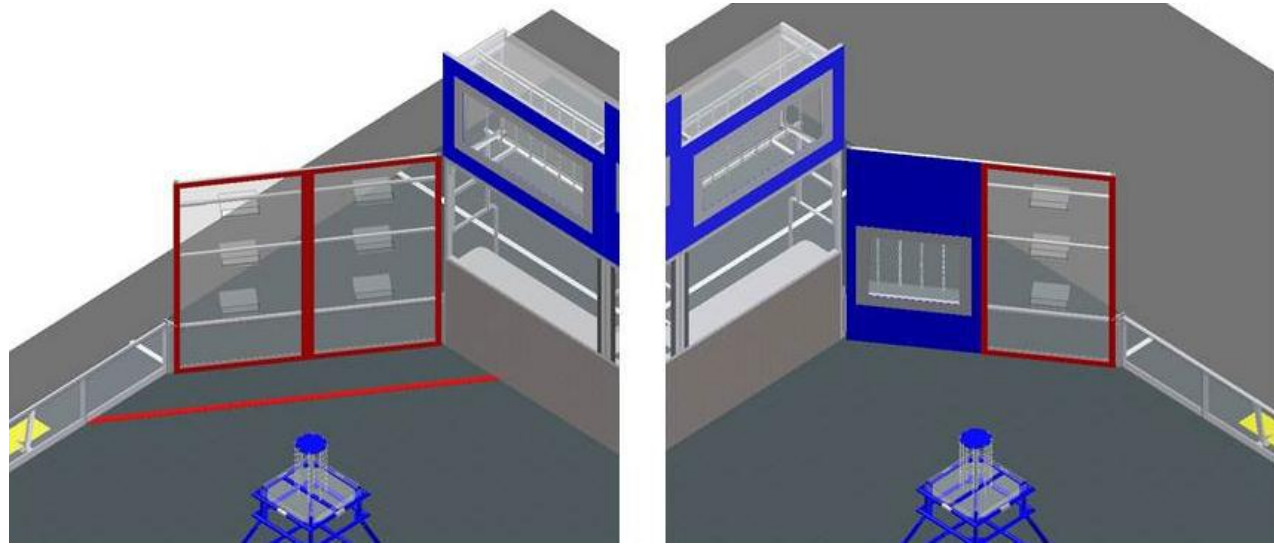




# Vision Targets



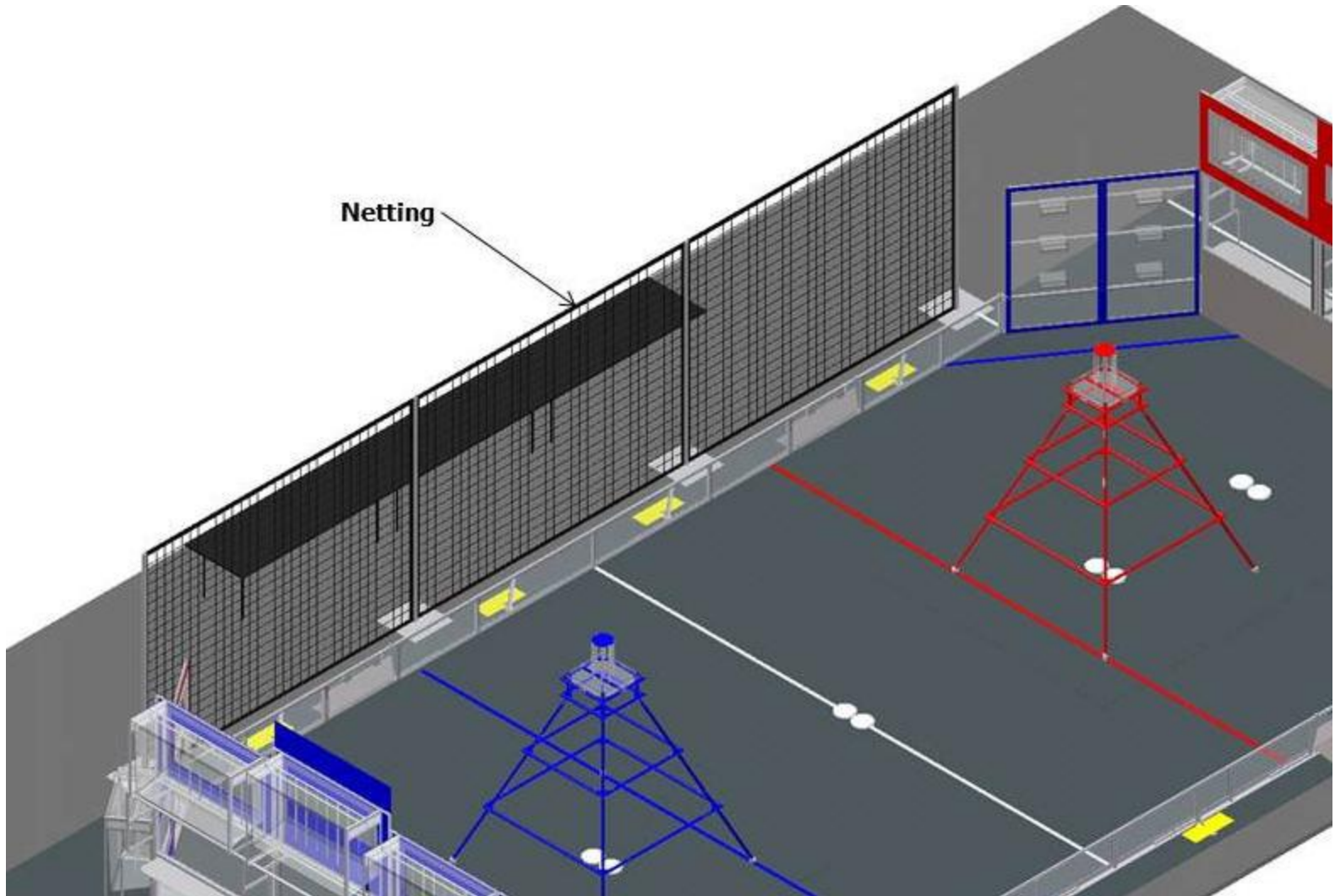
# Feeder Stations



There are three (3) FEEDER STATIONS per ALLIANCE. Two (2) FEEDER STATIONS are located side by side in one corner of the FIELD to the right of the ALLIANCE'S DRIVERS. The third FEEDER STATION is located next to the opponent's LOW GOAL on the opposite side of the ALLIANCE STATION.

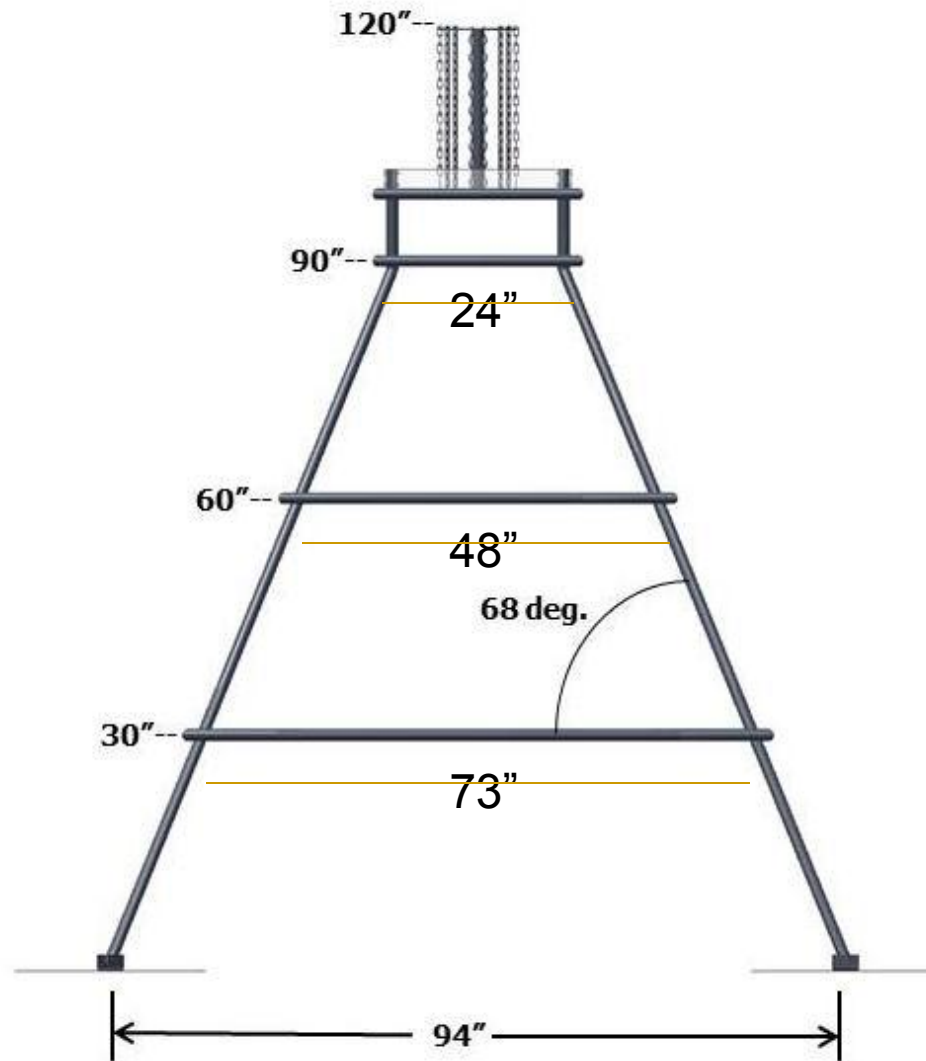
All of the FEEDER STATIONS consist of a 44 in. wide shield of clear polycarbonete. In the center of the shield are three horizontal FEEDER SLOTS, 12 in. wide by 3 in. high. These slots are located 22 in., 42 in. and 62 in. from the FIELD carpet to the bottom of the slot. Each slot has a slide attached to it on the FEEDER side of the plastic. These slides are 8 in. long and are at a 30-degree incline.

# Netting

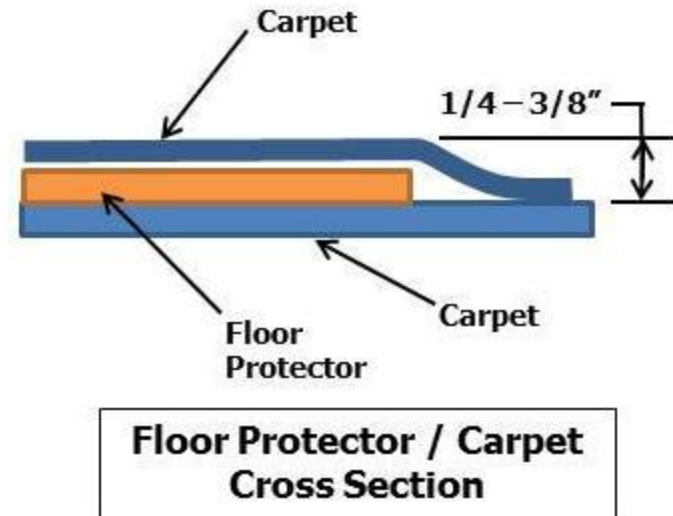
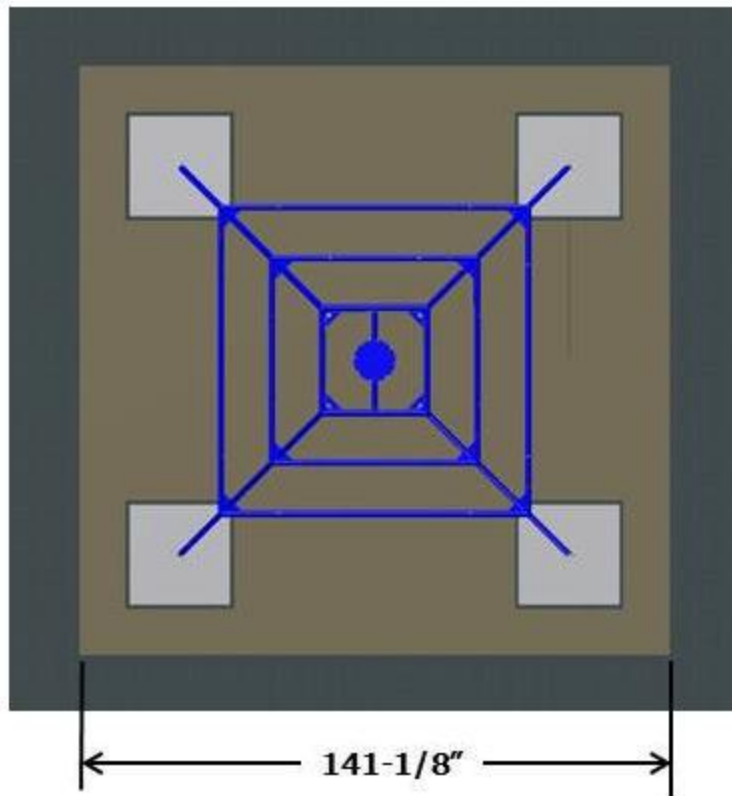




# Pyramids



# Pyramid Floor Protectors



# Discs



The DISCS are Wham-O part number 53214 (custom colored Red, White, or Blue) and have a diameter of 10 5/8 in., a height of 1 1/4 in., and a weight of 180 ± 5 grams

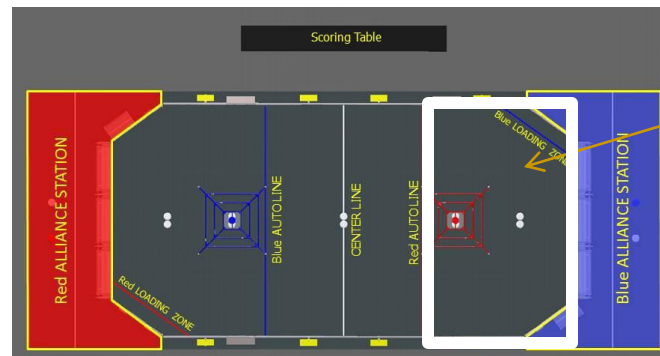
# The Game - DISCS

- Before match starts – DISCS staged
  - 118 White DISCS
    - No more than 2 or 3 White DISCS may be preloaded in each robot, depending on starting position (next slide)
    - 2 DISCS centered under each pyramid
    - 2 DISCS placed at center
    - 2 DISCS placed centered between guardrails and 78” from alliance wall
  - 6 Red DISCS and 45 White DISCS at Red Alliance Station
  - 6 Blue DISCS and 45 White DISCS at Red Alliance Station

# The Game - DISCS

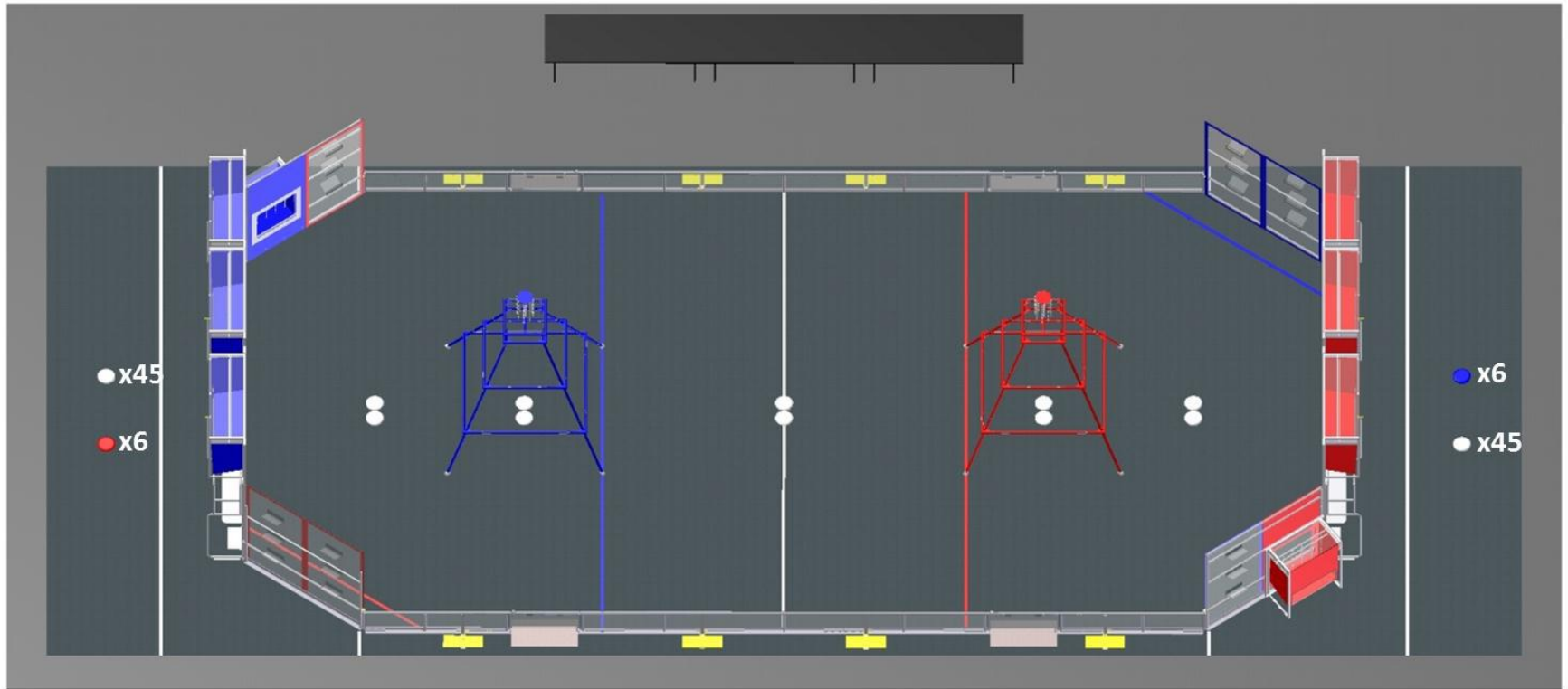
- TEAMS may preload White DISCS in or on the ROBOT before the MATCH.
  - A. If the ROBOT is in contact with any carpet outside its AUTO ZONE, the ROBOT may preload up to three (3) DISCS.
  - B. Otherwise, the ROBOT may preload up to two (2) DISCS.

Discs not loaded in robots entered on center line



Auto Zone

# The Game - DISCS



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# The Game – Robot Positioning

When placed on the field, each robot must be:

- A. in compliance with all robot rules (i.e. have passed Inspection),
- B. confined to its starting configuration,
- C. fully supported by the floor, and
- D. contacting its pyramid.

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# Game Play – Match Timing

- Match is 2 minutes and 15 seconds long
  - Autonomous period is 15 seconds at beginning
  - Teleoperated period is 2 minutes long



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# Game Play – Auto Rules

## AUTO Rules

During auto, a robot may not cross the center line such that it is no longer in contact with the carpet on its starting half of the field.

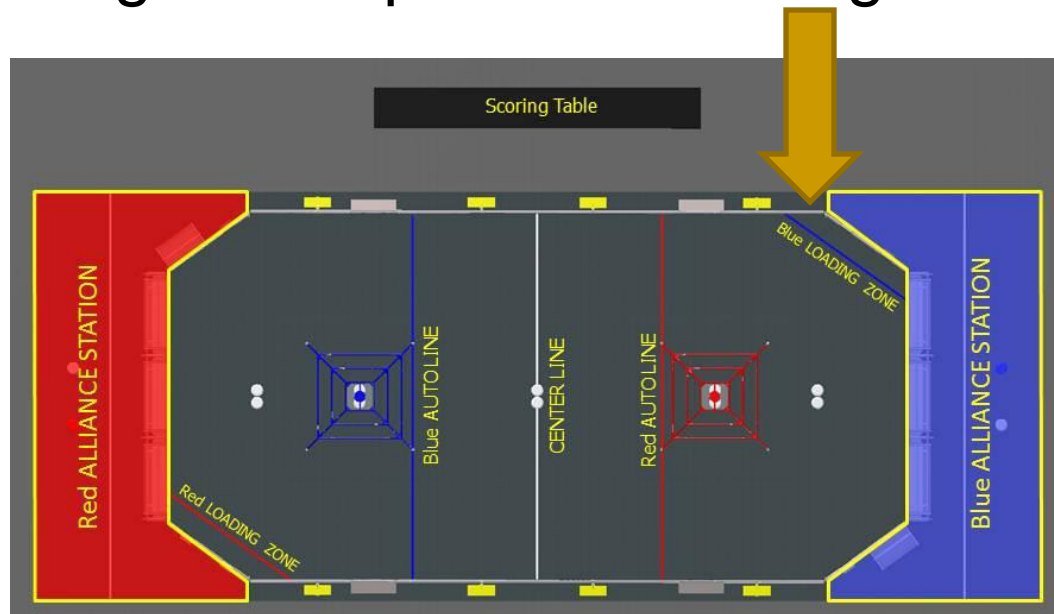
Violation: FOUL. If contact with an opponent robot, technical foul.

During AUTO, any control devices worn or held by the DRIVERS must be disconnected from the operator console and not connected until teleop.

Violation: FOUL

# Game Play – General Rules

- Regardless of who initiates the contact, a robot may not contact an opponent robot
  - ❑ Contacting its pyramid or
  - ❑ Touching the carpet in its loading zone



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# Human Actions

- Only feeders may touch DISCS
- DISC may be fed onto the field only under the following circumstances:
  - During teleop through the feeders slots and
  - During the last thirty seconds of the teleop over the feeder stations
- Teams may not extend any body part into the field or contact any robot at any time during the match

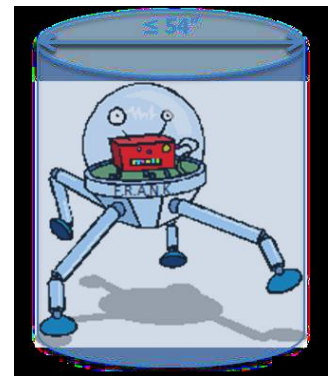
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# Human Actions

- During the Match, Operator console shall be operated solely by the Drivers on that team

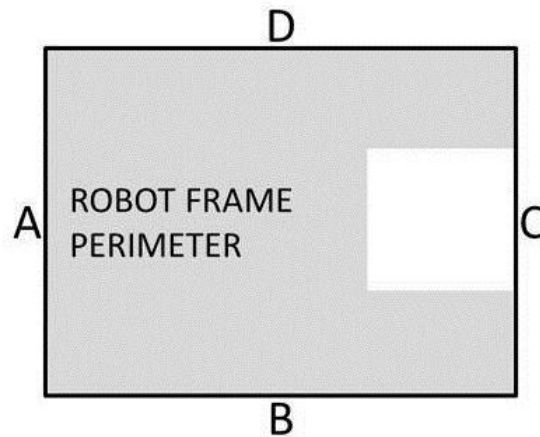
# Robot Size

- Robot height must be restricted during match
  - If in contact with the carpet in its Auto Zone and/or its pyramid,  $\leq 84$  in.
  - Otherwise,  $\leq 60$  in.
- Robot horizontal dimensions may never exceed a 54 in. diameter vertical cylinder

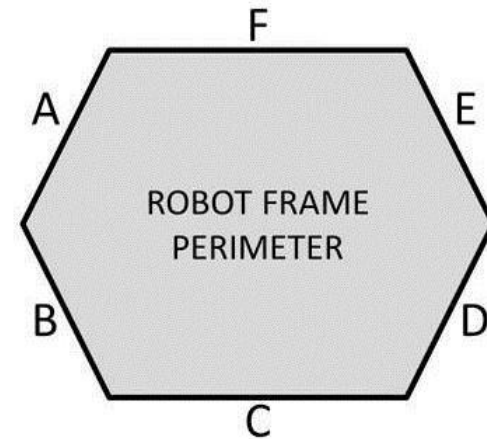


# Robot Size

- The robot must satisfy the following size constraints:
  - Total length of the frame perimeter sides may not exceed 112 in.
  - Heights may never exceed 84 in. tall



$$\text{FRAME PERIMETER LENGTH} = A+B+C+D \leq 112 \text{ in.}$$



$$\text{FRAME PERIMETER LENGTH} = A+B+C+D+E+F \leq 112 \text{ in.}$$

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# Robot Size

- The robot weight may not exceed 120 lbs. (excludes battery and its associated half of the Anderson cable and bumpers)
- Robot must have two attachment points for belaying device

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# Robot

- Robots may not actively control more than 4 DISCS at any one time
- Robots on same alliance may not blockade the field in an attempt to stop the flow of the match
- Robots may not intentionally fall down or tip over to block the field
- Robots may not contact or otherwise interfere with the opponents' pyramid. (inconsequential contact will not be penalized)

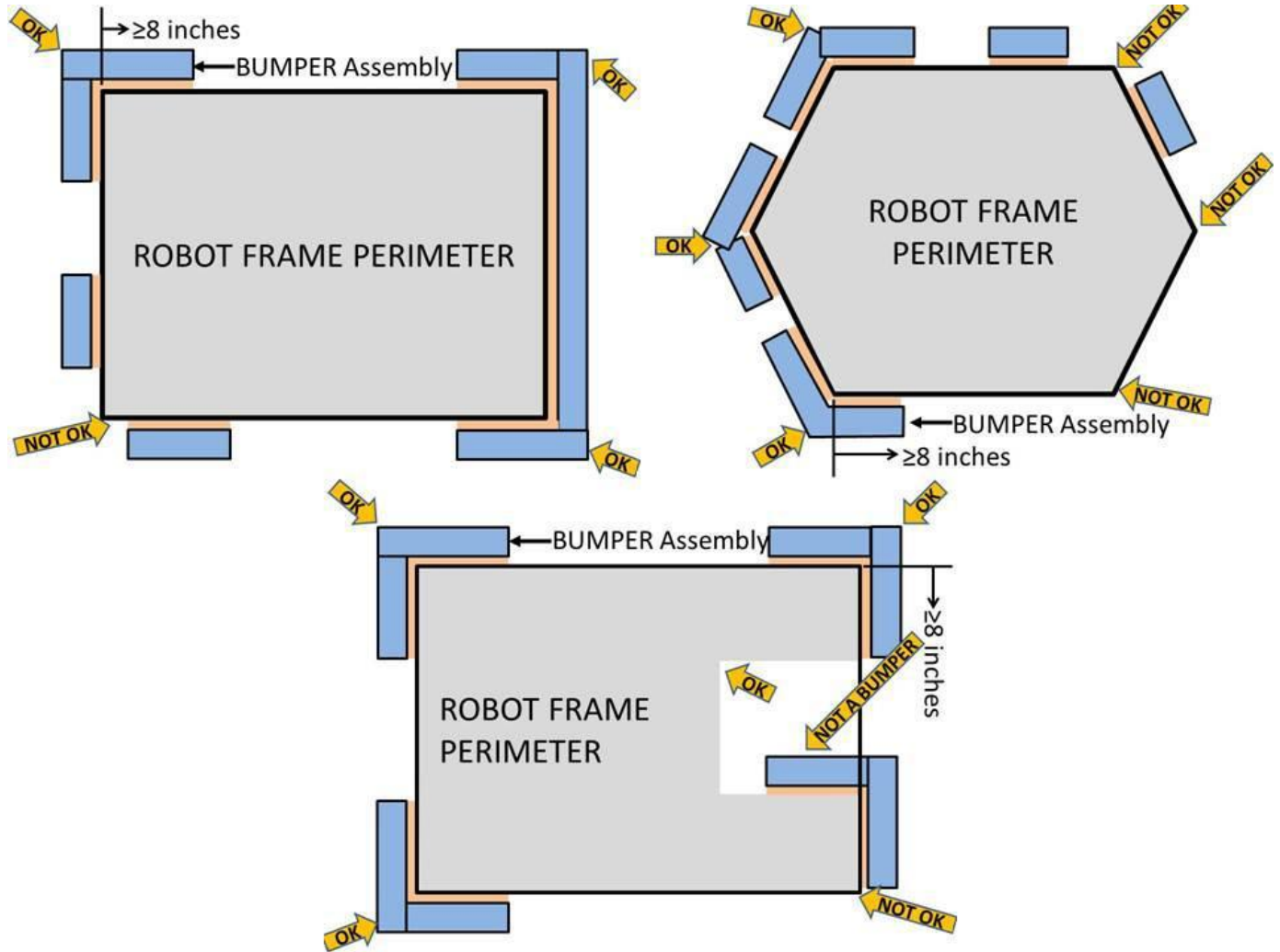


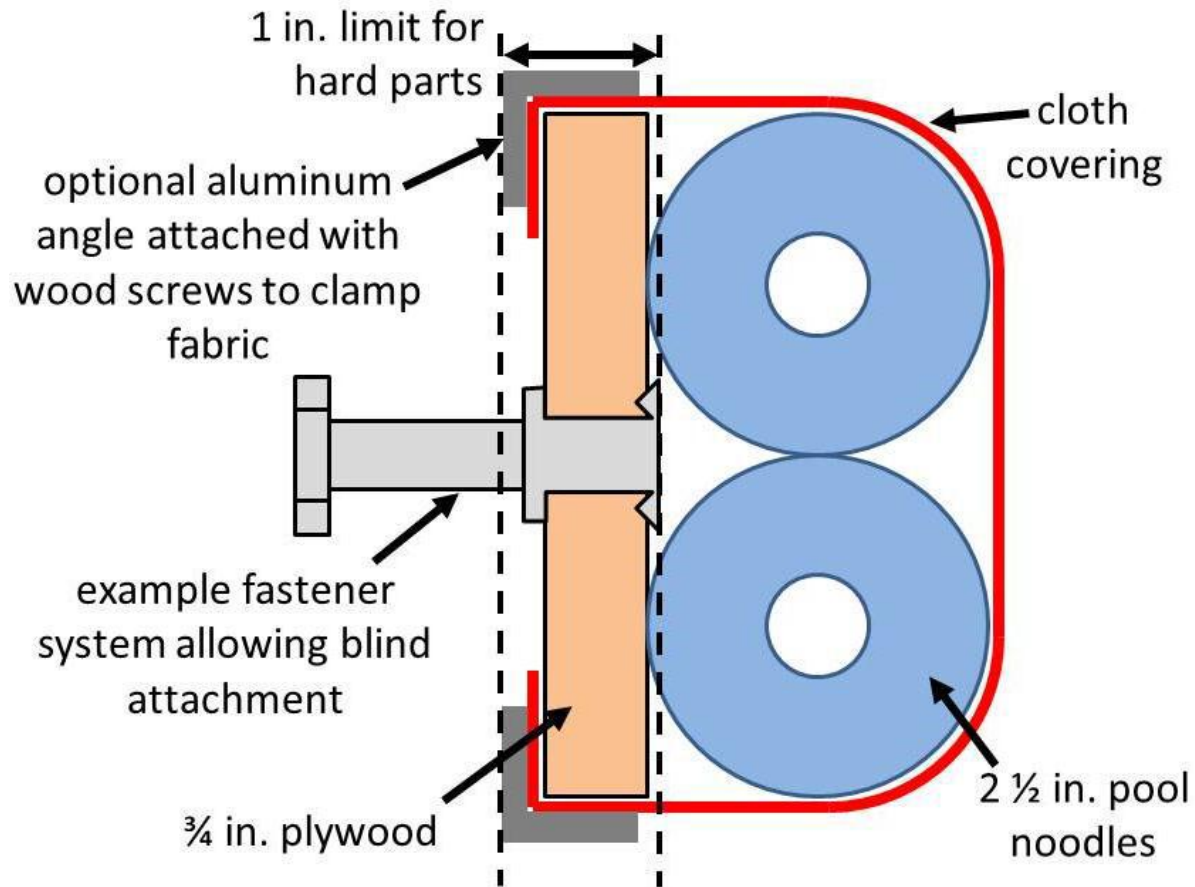
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# Bumper Rules

- Robots are required to use Bumpers to protect all outside corners of the frame perimeter. For adequate protection, at least 8 in. of bumper must be placed on each side of each outside corner

# Bumper Rules





- **BUMPERS** must be located entirely within the **BUMPER ZONE**, which is between 2 and 10 in. from the floor, in reference to the **ROBOT** standing normally on a flat floor.
- **BUMPERS** may not be articulated (relative to the **FRAME PERIMETER**).
- **Corner joints between BUMPERS** must be filled with pool noodle material. Examples of implementation are shown in **Figure 4-5**

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# Considerations

- What is important to do?
    - ❑ For auto period scoring
    - ❑ For DISC scoring
    - ❑ For picking up DISC vs. feeder loading
    - ❑ For climbing the pyramid
    - ❑ For tie breaking in ranking points
    - ❑ For durability and reliability
    - ❑ For making it past the qualification rounds (be the robot others want on their team)
    - ❑ To win engineering awards
  - Based on importance, do you want a big or small robot?
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# Considerations

- What can be done so that the robot will be done in time to practice?
- Should we plan to use the camera?
- What are strategies with the feeders
  - Ability to throw a DISC?
- Think about how you would do it if only humans played
- How can you effectively get DISCS in robot?
- What is impact on size restrictions?

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# Considerations

- What worked well in the past that we should repeat?
- What didn't work well in the past that we should avoid?
- What can be programmed?
- For building two robots?
- What do we know how to do?
- What can be done effectively?

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# Key Dates

- Robot Bag and Tag date is:
  - February 19, 2013

# Scoring Reminder


## DISC Points

	Auto	Teleop
Low Goal	2	1
Middle Goal	4	2
High Goal	6	3
Pyramid Goal	N/A	5



## Pyramid Climb Points

Level	Points
1	10
2	20
3	30





# Discussion Groups



1. Select someone to be spokesperson for group reviews
2. List what is important to do and why
3. Based on list of importance:
  1. Discuss strategies to accomplish what is important to do
  2. Discuss design considerations based on strategies
  3. Sketch / draw / create table, etc.

# Discussion Groups



1. You have until 4:00 PM to prepare for review
2. Include breaks
3. At 4:00 PM, we will go around the room and have each team present position
4. When done, we need to clean up the room as if we were never here

**GOOD LUCK!**