



F4 CADathon

2020 Spring Special

Section 1: Introduction

The intent of this manual is that the text means exactly, and only, what it says. Please avoid interpreting the text based on assumptions about intent, implementation of past rules, or how a situation might be in “real life.” There are no hidden requirements or restrictions. If you’ve read everything, you know everything.

The rule numbering scheme uses an indication of the section in which the rule is stated plus a serial numbering system (e.g. safety rules begin with “S,” game rules begin with “G,” etc.). References to specific rules use this scheme

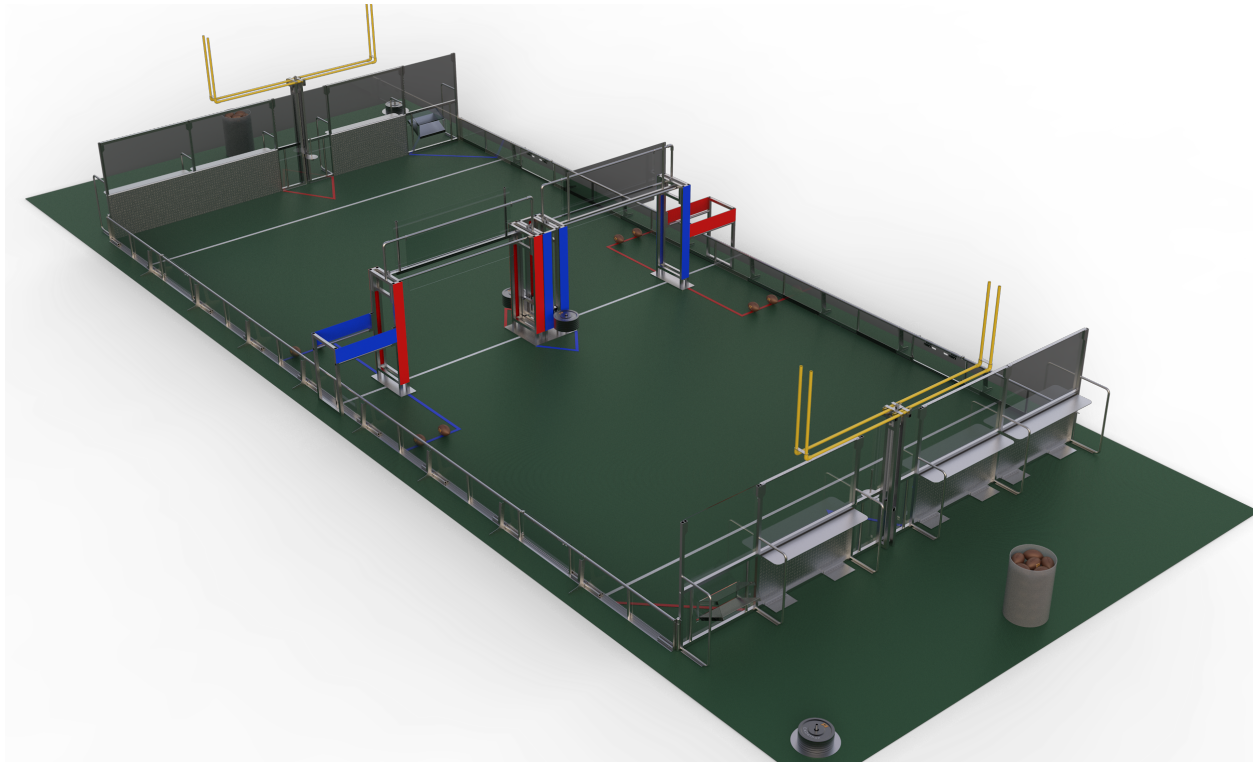
If you have a question regarding this game manual, the Game Design Committee (GDC) will answer questions on the Official Q/A. To submit a question use this form.

<https://forms.gle/EfsUYZys7iLyKz1y9>. To view previously asked questions and the answers to said questions, go here shorturl.at/hlyW9. The Q&A is intended to help clarify rules, and sometimes the responses result in revisions to the text in the official document (which is communicated using Team Updates)

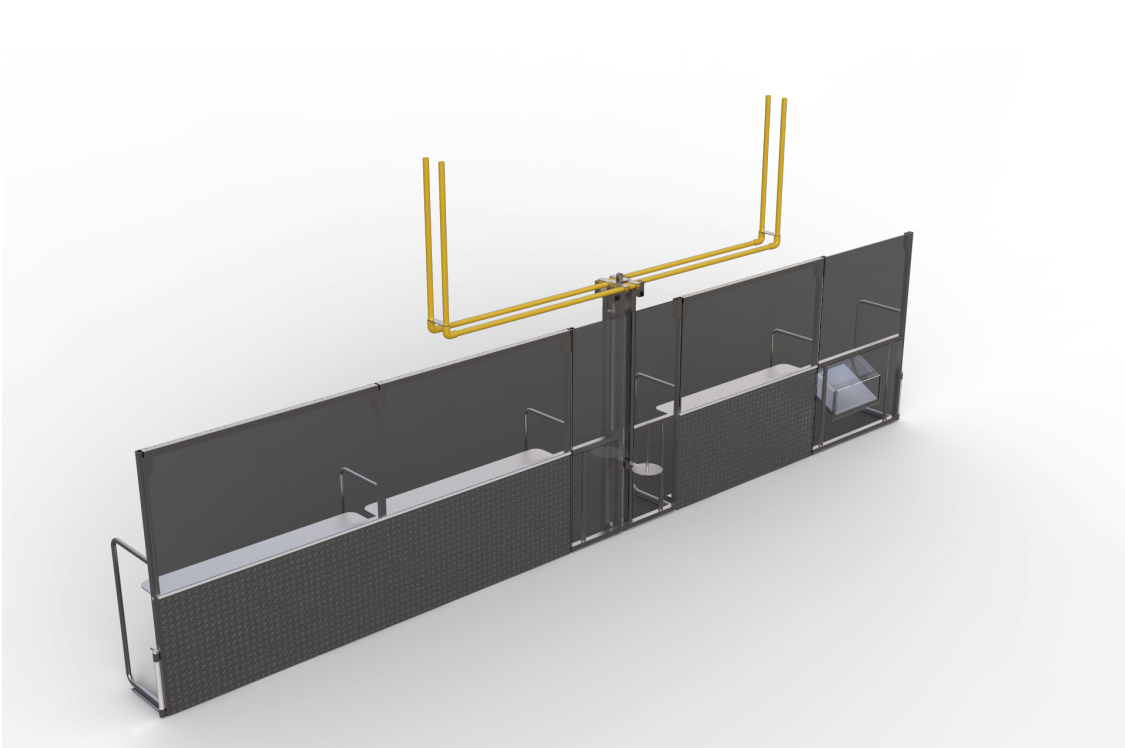
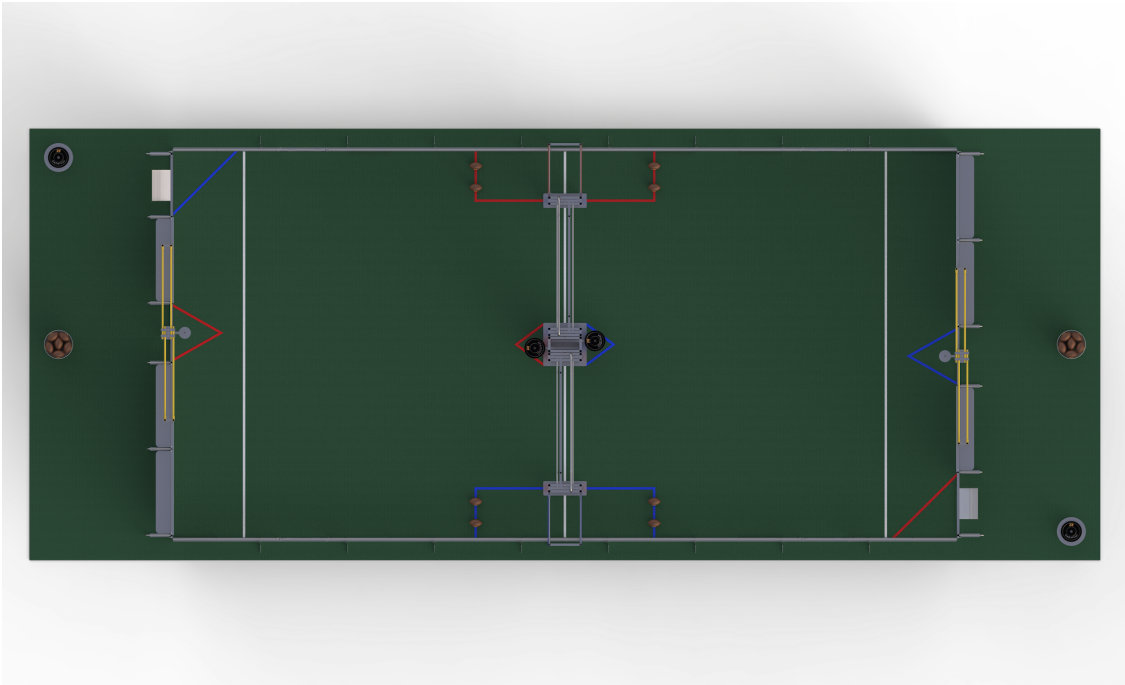
The GDC may release team updates throughout the course of the competition to notify teams of changes to the game manual. Updates will be posted in the Slack announcements channel.

Section 2: Overview

For the F4 CADathon Spring Special, we will be playing GameDay. *GameDay* is a game played by two (2) ALLIANCES of up to three (3) ROBOTS on a 27' by 54' carpeted FIELD. GameDay involves scoring FOOTBALLS, manipulating WEIGHT PLATES, and reaching the END ZONE.



Section 3: Arena



3.1: FIELD Layout

- ALLIANCE WALL
 - PLAYER STATION
 - HUMAN PLAYER STATION
- ZONES
 - HUMAN PLAYER RETRIEVAL ZONE
 - WEIGHT PLATE RETRIEVAL ZONE
 - LANE
 - ENDZONE
- BARS
 - STATIONARY BAR
 - LIMBO BAR
- SCORING LOCATIONS
 - FIELD GOAL
 - SCORING PEG

3.2: FIELD

The FIELD for GameDay is a 27 ft. (~823 cm) by 54 ft. (~1646 cm) carpeted area, bound by and including the inward-facing surfaces of the GUARDRAILS and ALLIANCE WALLS. The carpet used for the FIELD is green in color.

3.3 GUARDRAIL

The GUARDRAIL is a system that consists of transparent polycarbonate supported on the top and bottom by aluminum extrusion. The GUARDRAIL prevents ROBOTS from inadvertently exiting the FIELD during a MATCH. There are four (4) gates in the GUARDRAIL that allow access to the FIELD for placement and removal of ROBOTS. The gates are 3 ft. 2 in. (~97 cm) wide and closed and shielded during the MATCH.

3.4 ALLIANCE WALL

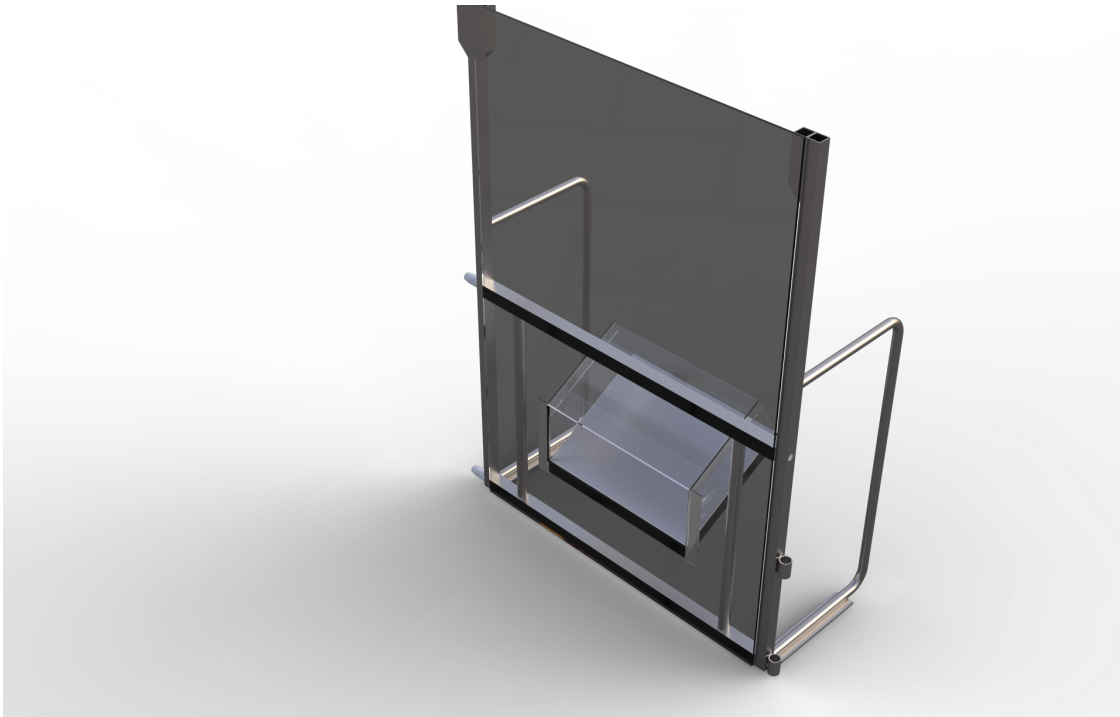
The ALLIANCE WALL is the structure that separates ROBOTS from DRIVE TEAMS and consists of three (3) PLAYER STATIONS, one (1) HUMAN PLAYER STATION, and one (1) FIELD GOAL assembly.

3.4.1 PLAYER STATION

A PLAYER STATION is one (1) of three (3) assigned positions in an ALLIANCE WALL from where a DRIVE TEAM operates their ROBOT. Each PLAYER STATION is made from a 3 ft. (~91 cm) tall diamond plate panel base topped with a 3 ft. 6 in. (~107 cm) tall transparent plastic panel. An aluminum shelf is attached to each PLAYER STATION to support the DRIVE TEAM'S OPERATOR CONSOLE. The shelf is 5 ft. 9 in. (~175 cm) wide and 1 ft. (~30 cm) deep. There is a 4 ft. 6 in. (~137 cm) long by 2 in. (nominal) wide strip of hook-and-loop tape ("loop" side) along the center of the support shelf that may be used to secure the OPERATOR CONSOLE to the shelf.

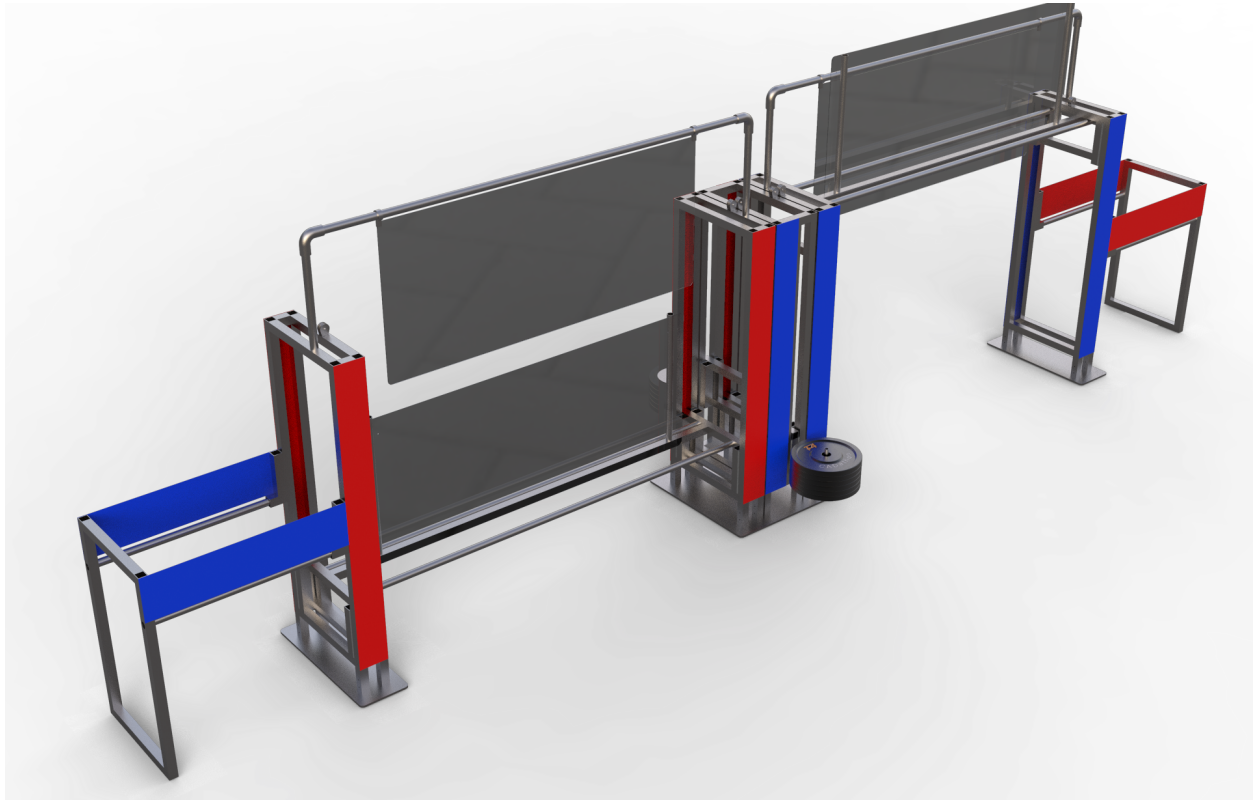
3.4.2 HUMAN PLAYER STATION

The HUMAN PLAYER STATION includes a single sloped slot with dimensions of 10 inches tall by 26 inches wide with the bottom of the opening resting 13 inches off of the playing floor.



3.5 BARS

The bar assembly includes two STATIONARY BARS and two LIMBO BARS, one each for each ALLIANCE. The bar assembly also includes a RETRIEVAL PEG for each ALLIANCE contained within the appropriate WEIGHT PLATE RETRIEVAL ZONE.



3.5.1 STATIONARY BARS

A STATIONARY BAR is a 44½ in. long bar that is fixed at a height of 36 in. above the LANE.

3.5.2 LIMBO BARS

A LIMBO BAR is a 111¼ in. long by 36 in. tall bar with polycarbonate assembly that is lowered as weights are removed. The LIMBO BAR will start at 6 ft. above the playing field, and will be lowered 8 in. for each weight removed, to a minimum height of 24 in.

3.6 Zones

3.6.1 HUMAN PLAYER RETRIEVAL ZONE

A HUMAN PLAYER RETRIEVAL ZONE is a 53¾ in. long by 53¾ in. wide infinitely tall triangular protected zone directly in front of the HUMAN PLAYER STATION and HUMAN PLAYER CHUTE. A HUMAN PLAYER RETRIEVAL ZONE is ALLIANCE-specific and designated with the appropriate ALLIANCE color tape.

3.6.2 WEIGHT PLATE RETRIEVAL ZONE

A WEIGHT PLATE RETRIEVAL ZONE is a 24 in. long by 36 in. wide infinitely tall triangular protected zone directly in front of the center edge of the LIMBO BARS. A WEIGHT PLATE RETRIEVAL ZONE is ALLIANCE-specific and designated with the appropriate ALLIANCE color tape.

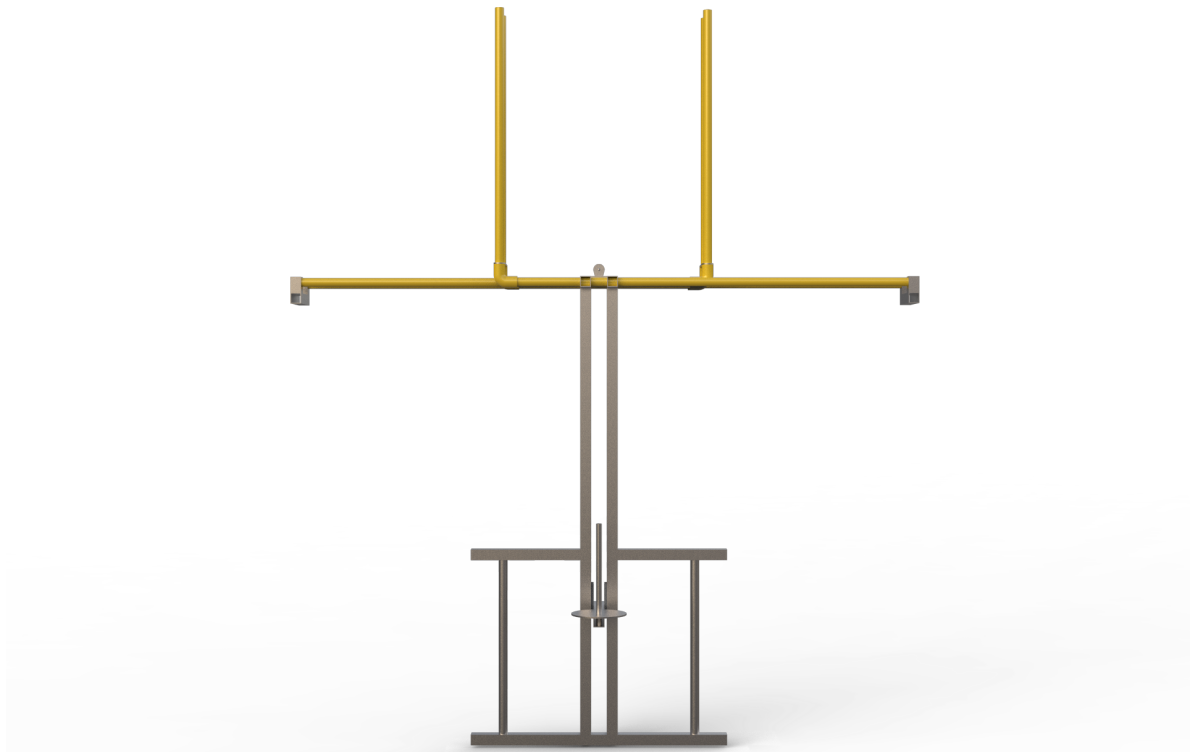
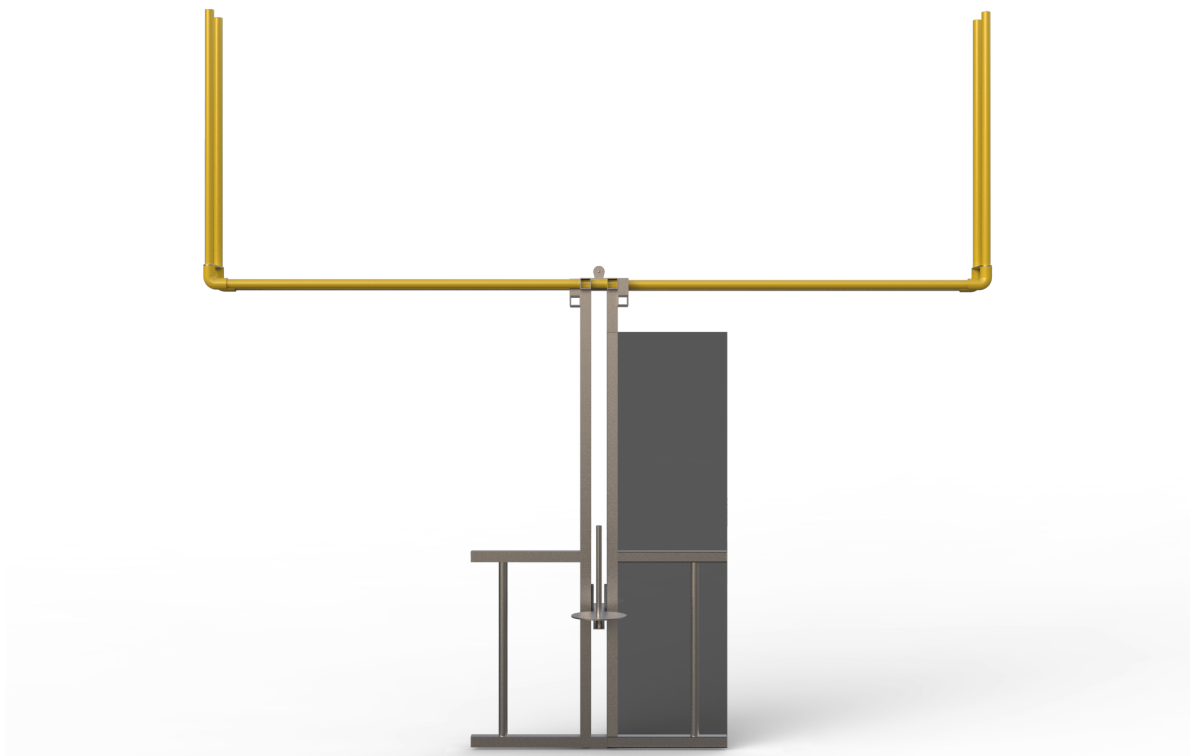
3.6.3 LANE

A LANE is a 12½ ft. by 42 in. infinitely tall rectangular protected zone directly under the STATIONARY BAR. A LANE is ALLIANCE-specific and designated with the appropriate ALLIANCE color tape.

3.6.4 END ZONE

An END ZONE is a 48 in. wide by 42 in. long infinitely tall triangular protected zone directly in front of the FIELD GOAL. An END ZONE is ALLIANCE-specific and designated with the appropriate ALLIANCE color tape.

3.7 Scoring Locations



3.7.1 FIELD GOAL

A FIELD GOAL is a 12 ft. wide by 11½ in. tall U-shaped structure in which FOOTBALLS are scored. The FIELD GOAL starts at 12 ft. wide and becomes progressively narrower by 1 ft, for each weight added to the opponent's FIELD GOAL, to a minimum width of 1 ft.

3.7.2 SCORING PEG

A SCORING PEG is a 1 in. diameter rod on each FIELD GOAL on which WEIGHT PLATES are placed. The top of the SCORING PEG starts at a height of 42 in., and with each weight added it lowers 2 in., to a minimum of 20 in.

3.8 GAME PIECES

3.8.1 FOOTBALLS

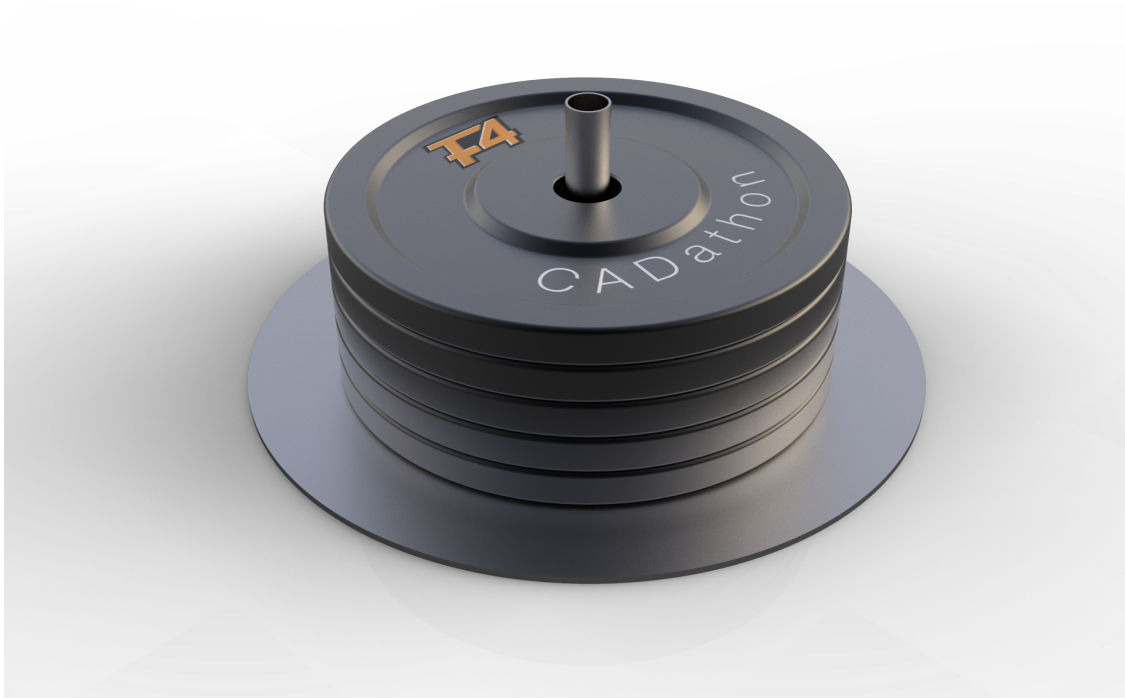
A FOOTBALL is a 7 in. diameter by 11 in. tall leather ball, similar to Wilson footballs used in the sport of football. FOOTBALLS will be placed in a BIN behind the ALLIANCE WALL by FIELD STAFF after they are scored.





3.8.2 WEIGHT PLATES

A WEIGHT PLATE is a 2¼ in. inner diameter by 17½ in. outer diameter by 1⅝ in. tall rubber plate with a weight of 10 lbs.



3.9 Audio Cues

FMS alerts participants to milestones in the MATCH using audio cues. Please note that audio cues are intended to be a courtesy to participants and not intended as official MATCH markers. If there is a discrepancy between an audio cue and the FIELD timers, the FIELD timers are the authority.

- MATCH Start “Cavalry Charge” then Three (3) Bells
- T-30 seconds: Train Whistle
- T=0 for MATCH end: Buzzer
- MATCH stopped: Foghorn

Section 4: MATCH Play

4.1 MATCH Stages

MATCH Timing - Each MATCH is 2 minutes and 15 seconds long. There is no Autonomous period for the purpose of this event. The last 30 seconds of the MATCH are known as the ENDGAME period.

4.2 MATCH Setup

At the start of the match, 6 WEIGHT PLATES are placed on each ALLIANCE’S RETRIEVAL PEG. 5 WEIGHT PLATES are available behind each ALLIANCE WALL. In addition, 4 FOOTBALLS are placed in each LANE, and 30 footballs are available in the bin behind each ALLIANCE WALL.

Before the match begins, teams may preload their robot with 1 weight plate and up to 3 FOOTBALLS. Game pieces not prestaged in a robot are given to the HUMAN PLAYERS to get some reps in before the match begins.

M01 When placed on the FIELD for a MATCH, each ROBOT must be:

- A. in compliance with all ROBOT rules, i.e. has passed Inspection,
- B. the only item left on the FIELD by the DRIVE TEAM,
- C. confined to its STARTING CONFIGURATION,
- D. set on the carpet,
- E. in contact with its ALLIANCE WALL diamond plate,

Violation: If fix is a quick remedy, the MATCH won't start until all requirements are met. If it is not a quick remedy the offending ROBOT will be DISABLED and, at the discretion of the Head REFEREE, must be re-inspected.

M02 DRIVE TEAMS may not cause significant or repeated delays to the start of a MATCH and/or to the FIELD reset after the MATCH.

Violation: If prior to the MATCH, the offending DRIVE TEAM'S ROBOT will be DISABLED. If after the MATCH, YELLOW CARD.

DRIVE TEAMS are expected to stage their ROBOTS for a MATCH, and remove it from the FIELD afterwards, safely and swiftly. Examples include, but are not limited to:

A. late arrival to the FIELD

B. failing to exit the FIELD once the LED strings have turned off (indicating MATCH ready)

C. installing BUMPERS, charging pneumatic systems, or any other ROBOT maintenance, once on the FIELD

D. use of alignment devices that are external to the ROBOT (e.g. a DRIVE TEAM could bring and use a measuring tape, as long as there is no delay to the MATCH by doing so)

E. failing to remove OPERATING CONSOLES from the PLAYER STATIONS in a timely manner

4.3 Scoring

FOOTBALLS once scored through the uprights of the FIELD GOAL are returned to the bin behind the ALLIANCE WALL by field staff. FOOTBALLS may only be scored once before being reentered to the FIELD by HUMAN PLAYERS.

WEIGHT PLATE points are evaluated at the end of the MATCH.

No more than 11 WEIGHT PLATES can be scored by an ALLIANCE.

4.3.1 MATCH Scoring

Action	Criteria	Points
FOOTBALL scored	A FOOTBALL passes between the posts of the FIELD GOAL	2 points per FOOTBALL
WEIGHT PLATE placed	A WEIGHT PLATE is	10 points per WEIGHT

	secured on the ALLIANCE'S SCORING PEG	PLATE
ENDGAME Completed	ROBOT breaking the vertical plane of the tape of the ENDZONE	25 points per ROBOT
Body Builder RP	Score 11 WEIGHT PLATES on the SCORING PEG	1 Ranking Point
Touchdown RP	All 3 ROBOTS complete the ENDGAME	1 Ranking Point
Win the match	Score more points than your OPPONENT	2 Ranking Points
Tie the match	Score the same amount of points as your OPPONENT	1 Ranking Point

4.3.2 Rankings

Ranking Points (RP) are units credited to a team based on their ALLIANCE'S performance in Qualification MATCHES. Ranking Points are awarded to each eligible team at the completion of each Qualification MATCH per section [3.3.1 MATCH Scoring](#)

Exceptions to Ranking Point assignment are as follows:

- A. A SURROGATE receives zero (0) Ranking Points.
- B. A DISQUALIFIED team, as determined by the Head REFEREE, receives zero (0) Ranking Points in a Qualification MATCH or causes their ALLIANCE to receive zero (0) MATCH points in a Playoff MATCH.
- C. A "no-show" team is either DISQUALIFIED from or issued a RED CARD for that MATCH (see C6). A team is declared a no-show if no member of the DRIVE TEAM is in the ALLIANCE STATION at the start of the MATCH.

The total number of Ranking Points earned by a team throughout their Qualification MATCHES divided by the number of MATCHES they've been scheduled to play (minus any SURROGATE MATCH), then truncated to two (2) decimal places, is their Ranking Score (RS).

Order Sort	Criteria
1st	Ranking Score
2nd	Cumulative ENDGAME points
3rd	Cumulative WEIGHT PLATE points
4th	Cumulative FOOTBALL points
5th	Random sort by FMS

4.4: Rule Violations

Upon a rule violation, one or more of the penalties will be assessed and action will be taken according to the table below listed below

Action	Penalty
FOUL	5 points deducted from your score
TECH FOUL	15 points deducted from score
YELLOW CARD	A warning given by the REFEREES
RED CARD	The result of 2 YELLOW CARDS leading to the disqualification of a particular MATCH.
DISABLED	The ROBOT will be rendered inoperable for the remainder of the MATCH.

4.5 MATCH Logistics

M03 Any game piece that leaves the FIELD will not be returned to MATCH play. Game pieces that inadvertently deflect back into the FIELD will be considered fair game. Note that ROBOTS may not deliberately cause game pieces to leave the FIELD (see G16), with the exception of scoring FOOTBALLS in their ALLIANCE'S FIELD GOAL.

Section 5: Safety Rules

Safety is paramount at all times during any Tournament, and each rule below is intended to establish norms at each event that will mitigate injury risk to all participants

S01 ROBOTS whose operation or design is dangerous or unsafe are not permitted.

Violation: If before the MATCH, the offending ROBOT will not be allowed to participate in the MATCH. If during the MATCH, the offending ROBOT will be DISABLED.

Examples include, but are not limited to:

- A. Uncontrolled motion that cannot be stopped by the DRIVE TEAM
- B. ROBOT parts (or ROBOTS) that exit the playing FIELD
- C. ROBOTS dragging their battery
- D. ROBOTS that consistently extend beyond the FIELD
- E. ROBOTS that pose risk of damage to the FIELD
- F. ROBOTS that risk damage to other ROBOTS
- G. ROBOTS that pose a danger to members of the DRIVE TEAM, spectators, or FIELD personnel

S02 ROBOTS and anything they control, e.g. a game piece, may not contact anything outside the FIELD with the exception of brief incursions beyond the HUMAN PLAYER CHUTE.

Violation: Offending ROBOT will be DISABLED. Please be conscious of REFEREES, and FIELD STAFF working around the FIELD who may be in close proximity to your ROBOT.

S03 Stay out of the tunnels. DRIVE TEAMS may not extend any body part into the HUMAN PLAYER CHUTE. Momentary encroachment into these volumes is an exception to this rule.

Section 6: Game Rules

6.1 ROBOT Restrictions

G01 ROBOTS may not extend more than 16 in (41 cm). beyond their FRAME PERIMETER

Violation: TECH FOUL.

G02 ROBOTS may not extend more than 12 in beyond their STARTING CONFIGURATION height.

Violation: TECH FOUL.

G03 ROBOTS may not intentionally detach or leave parts on the FIELD.

Violation: TECH FOUL. May escalate to DISABLED ROBOT, YELLOW CARD, RED CARD.

G04 ROBOTS must be in compliance with BUMPER rules throughout the MATCH.

Violation: FOUL. DISABLED if any BUMPER segment becomes completely detached, any side of a ROBOT is completely exposed (without BUMPER), or the Team number or ALLIANCE color becomes indeterminate.

G05 ROBOTS will not be re-enabled after the conclusion of the MATCH, nor will Teams be permitted to tether to the ROBOT except in special circumstances (e.g. during TIMEOUTS, after Opening Ceremonies, before an immediate MATCH replay, etc.) and with the express permission from the FTA or a REFEREE.

Violation: YELLOW CARD

G06 Robots may not launch, propel, or otherwise forcefully project WEIGHT PLATES.

Violation: TECH FOUL per occurrence

6.2 ROBOT To ROBOT Interaction

G07 Strategies aimed at the destruction or inhibition of ROBOTS via attachment, damage, tipping, or entanglements are not allowed.

G08 Initiating deliberate or damaging contact with an opponent ROBOT on or inside the vertical extension of its FRAME PERIMETER, including transitively through a game piece, is not allowed.

G09 Two or more ROBOTS may not isolate or close off any major component of MATCH play, e.g. blocking FIELD GOALS, LIMBO BARS, shutting down all access to game pieces, quarantining all opponents to a small area of the FIELD, etc.

Violation: YELLOW CARD for the ALLIANCE. A single ROBOT blocking access to a particular area of the FIELD is not a violation of G08. Two ROBOTS independently playing defense on two opposing ROBOTS is not a violation of this rule.

G10 Fallen (i.e. tipped over) ROBOTS attempting to right themselves (either by themselves or with assistance from a partner ROBOT) have one ten (10) second grace period in which they may not be contacted by an opponent ROBOT. This protection lasts for either ten (10) seconds or until the protected ROBOT has completed the righting operation, whichever comes first.

Violation: FOUL. If intentional, YELLOW CARD.

G11 ROBOTS may not PIN an opponent's ROBOT for more than five (5) seconds. A ROBOT will be considered PINNED until the ROBOTS have socially distanced by at least six (6) feet. The PINNING ROBOT(s) must then wait for at least three (3) seconds before attempting to PIN the same ROBOT again. PINNING is transitive through other objects. If the PINNED ROBOT chases the pinning ROBOT upon retreat, the PINNING ROBOT will not be penalized, and the PIN will be considered complete.

Violation: FOUL, plus an additional FOUL for every five (5) seconds in which the situation is not corrected. If extended, RED CARD.

G12 Unless during ENDGAME or attempting to right a fallen (i.e. tipped over) ALLIANCE partner, ROBOTS may neither fully nor partially strategically support the weight of partner ROBOTS.

Violation: TECH FOUL.

G13 ROBOTS may not contact an OPPONENT'S ROBOT when any part of the OPPOSING ROBOT is contained within their HUMAN PLAYER RETRIEVAL ZONE, WEIGHT PLATE RETRIEVAL ZONE, LANE, or END ZONE.

Violation: FOUL

6.3 FIELD Interactions

G14 DRIVE TEAMS, ROBOTS, and OPERATOR CONSOLES are prohibited from the following actions with regards to interaction with FIELD elements. Items A and B exclude DRIVE TEAM interaction with FIELD elements in their areas. Item C excludes the use of the PLAYER STATION hook-and-loop tape, plugging into the provided power outlet, and plugging the provided Ethernet cable into the OPERATOR CONSOLE.

A. Grabbing

- B. Grasping
- C. Attaching to (including the use of hook-and-loop tape against the FIELD carpet)
- D. Hanging
- E. Deforming
- F. Becoming entangled
- G. Damaging

Game Pieces are expected to undergo wear and tear. Minor scuffs, dings, and scratches are not a violation of G14.

G15 With the exception of Scoring, ROBOTS may not deliberately use game pieces in an attempt to ease or amplify the challenge associated with FIELD elements.

Violation: TECH FOUL per game piece. Repeated or egregious violations of this rule are likely to escalate rapidly to YELLOW or RED CARDS.

G16 ROBOTS may not intentionally eject game pieces from the FIELD.

Violation: FOUL per Game Piece. Repeated violations of this rule are likely to escalate rapidly to YELLOW or RED CARDS.

G17 ROBOTS may not CONTROL more than one (1) WEIGHT PLATE at any given time.

Violation: TECH FOUL per Game Piece per instance.

G18 ROBOTS may not remove WEIGHT PLATES from an OPPONENT'S SCORING PEG.

Violation: TECH FOUL and the WEIGHT PLATE is considered scored at the end of the match.

G19 WEIGHT PLATES may not be launched, propelled, thrown, or otherwise forcefully projected more than a few inches.

Violation: TECH FOUL per occurrence

G20 ROBOTS may not completely cross the tape line associated with their OPPONENT'S LIMBO BAR.n

Section 7: ROBOT Rules

The rules listed below explicitly address legal parts and materials and how those parts and materials may be used on a CADathon ROBOT. There are many reasons for the structure of the rules, including safety, reliability, parity, creation of a reasonable design challenge, adherence to professional standards, and impact on the competition.

F4 CADathon can be a full-contact competition and may include rigorous game play. While the rules aim to limit severe damage to ROBOTS, teams should design their ROBOTS to be robust.

7.1: General ROBOT Design

R01 The ROBOT (excluding BUMPERS) must have a FRAME PERIMETER, contained within the BUMPER ZONE, that is comprised of fixed, non-articulated structural elements of the ROBOT. Minor protrusions no greater than ¼ in. (~6.3 mm) such as bolt heads, fastener ends, weld beads, and rivets are not considered part of the FRAME PERIMETER.

R02 In the STARTING CONFIGURATION (the physical configuration in which a ROBOT starts a MATCH), no part of the ROBOT shall extend outside the vertical projection of the FRAME PERIMETER, with the exception of its BUMPERS and minor protrusions such as bolt heads, fastener ends, rivets, cable ties, etc.

R03 In the STARTING CONFIGURATION, the maximum ROBOT size (excluding BUMPERS) must be constrained to a FRAME PERIMETER of 120 in. Minor protrusions permitted in R01 and R02 (that are less than ¼ in. (~6.3 mm) such as bolt heads, fastener ends, weld beads, and rivets) are exempt from the 120 in. limit.

R04 In the STARTING CONFIGURATION, the maximum ROBOT height is 60 in. tall.

R05 ROBOTS may not extend more than 16 in. (~40 cm) beyond their FRAME PERIMETER. (see G01).

R06 The ROBOT weight must not exceed 125 lbs. When determining weight, the basic ROBOT structure and all elements of all additional MECHANISMS that might be used

in different configurations of the ROBOT shall be weighed together. For the purposes of determining compliance with the weight limitations, the following items are excluded:

A. ROBOT BUMPERS

B. ROBOT battery and its associated half of the Anderson cable quick connect/disconnect pair

(including no more than 12 in. (~30 cm) of cable per leg, the associated cable lugs, connecting bolts, and insulation)

C. tags used for location detection systems if provided by the event

7.2 ROBOT Safety And Damage Prevention

R07 Traction devices must not have surface features such as metal, sandpaper, hard plastic studs, cleats, hook-loop fasteners or similar attachments that could damage the FIELD. Traction devices include all parts of the ROBOT that are designed to transmit any propulsive and/or braking forces between the ROBOT and FIELD carpet

R08 Protrusions from the ROBOT and exposed surfaces on the ROBOT shall not pose hazards to the FIELD elements (including the game pieces) or people.

R09 ROBOT parts shall not be made from hazardous materials, be unsafe, cause an unsafe condition, or interfere with the operation of other ROBOTS. These include:

A. Shields, curtains, or any other devices or materials designed or used to obstruct or limit the vision of any DRIVERS and/or COACHES and/ or interfere with their ability to safely control their ROBOT

B. Speakers, sirens, air horns, or other audio devices that generate sound at a level sufficient to be a distraction

C. Any devices or decorations specifically intended to jam or interfere with the remote sensing capabilities of another ROBOT, including vision systems, acoustic range finders, sonars, infrared proximity detectors, etc.

D. Exposed lasers other than Class I.

E. Flammable gasses

F. Any device intended to produce flames or pyrotechnics

G. Hydraulic fluids or hydraulic items

H. Switches or contacts containing liquid mercury

I. Circuitry used to create voltages in excess of 24V

J. Any ballast not secured sufficiently, including loose ballast e.g. sand, ball bearings, etc., such that it may become loose during a MATCH.

K. Exposed, untreated hazardous materials (e.g. lead weights) used on the ROBOT. These materials may be permitted if painted, encapsulated or otherwise sealed to prevent contact. These materials may not be machined in any way at an event.

L. Tire sealant

R10 ROBOTS must allow removal of game pieces from the ROBOT and the ROBOT from FIELD elements while DISABLED and powered off.

7.3 ROBOT Design Requirements

R11 A Team must submit their ROBOT for Inspection. The ROBOT must be an electromechanical assembly designed by the CADathon Team to perform specific tasks when competing in *GameDay*. The ROBOT should include all of the basic systems required to be an active participant in the game – power, communications, control, BUMPERS, and movement. The ROBOT implementation must obviously follow a design approach intended to play *GameDay* (e.g. a box of unassembled parts placed on the FIELD, or a ROBOT designed to play a different game does not satisfy this definition). R11 requires that this ROBOT has been purpose-designed for *GameDay*

R12 All ROBOTS will go through a brief formal inspection by a GDC member. The inspection will go on during the judging process. If a team is breaking a rule it will be taken into consideration during judging and cause a 5 point penalty per broken rule.

R13 Mechanical/electrical designs created before Kickoff are only permitted if the source files are from COTS part providers. If the part is designed by you, the part needs to be publically available before and during the entirety of CADathon.

R14 Teams are required to CAD a single set of BUMPERS up to external specifications. This can be in any color or texture you like as long as it is PG. Adding a way to actually mount the BUMPERS is a good way to earn points with the JUDGES in terms of model detail. The BUMPERS will also objectively always be made of FRC regulation fabrics.

R15: Sections 9.4, 9.5, 9.6, 9.7, 9.8, and 9.9 of the FIRST INFINITE RECHARGE manual must be followed as they reasonably pertain to F4 CADathon, The manual can be found here:

<https://firstfrc.blob.core.windows.net/frc2020/Manual/2020FRCGameSeasonManual.pdf>

Section 8: CADathon Rules

8.1 Logistics

C01 Premade CAD models may be used as long as they are of a COTS COMPONENT. If they are not a COTS COMPONENT they must be available for download publicly before and during the CADathon. See R13

C02 There is no limit on CADathon team size IF everyone on the CADathon team is a member of the same FIRST (FRC etc.) team. For CADathon teams with members of different FIRST teams, teams may consist of up to three (3) members. Larger teams may be allowed at the discretion of the GDC.

C03 Communication between teams is allowed. Sharing parts however, is against the rules and will lead to the disqualification of both teams.

C04 Teams MUST submit the following

- A. STEP File of the ROBOT assembly
Native CAD files are appreciated but not required
- B. Completed Scouting Document
- C. At least 1 rendering of the entire ROBOT
additional renders are appreciated but not required

Please name all files and documents with your CADathon team number followed by a short description.

Ex. 0000_RobotSTEP, 0000-FullRender, 0000 Scouting Document, etc. We regularly have 10+ team files open at a time when organizing submissions, don't get lost in the cloud!

C05 The CADathon will begin at 6pm EST on 04/12/2020 and conclude at 8pm EST on 04/19/2020. All CAD files, ROBOT Renders, and Pit Scouting sheets must be submitted by 04/19/20 at 8PM EST. More details can be found in the event folder.

Due to the extended event time period and amount of teams competing, late and incorrect submissions will not be tolerated. Give yourself plenty of time to submit your files and contact Levi Madden in Slack or email F4CADathon@gmail.com if you have any questions.

C06 Have Fun, and if you think you see a hole in the rules tell us (We make these games in short periods of time). Please remember that although this CADathon is not

an official FIRST event, we still practice Gracious Professionalism. Questions may be asked on the Q/A at <https://forms.gle/EfsUYZys7iLyKz1y9> and answers will be posted at shorturl.at/hlyW9. This is the only place to get an official answer or rule clarification. (the questions channel on Slack is no longer an official ruling by the GDC)

C07 All participants must accept the invitation to join the CADathon Slack chat that has been sent to the emails the participants registered with for the CADathon. The participants must also be active/periodically checking the Slack for game and rule updates and easy communication. If a participant believes they did not receive an invitation to the Slack, they should contact F4CADathon@gmail.com

C08 Teams should refrain from sharing images of their robots until after the live show to allow the proper amount of “hype.”

Teasers and other team promotions (build blogs, social media posts, etc.) are mostly allowed as long as full renders of the final robot are not posted. email us at F4CADathon@gmail.com to inquire about your potential promotion ideas.

C09 All submissions must be via the CADathon submission form. Details can be found in the event folder. shorturl.at/tvJKP

C10 Breaking design rules if not egregious will result in a 5 point penalty to the final judged score of a participant. Egregious rule breaking will result in a disqualification from the CADathon show.

C11 ROBOTS will be judged on the following criteria by a panel of JUDGES with design experience. Each JUDGE will score ROBOTS independently.

Score	Creativity	Detail	Effectiveness
1	Shows very little creativity.	Simple Shapes	Nothing about the robot will function correctly.
2	Shows glimmers of creativity	Accurate Model Sizes	It can drive.
3	Moderately creative	Adds detail such as gussets and setting materials	Can interact with non driving game elements.
4	Very creative	Some fasteners	Can potentially play game effectively

5	Extremely Creative. Something unlike anything you have seen before.	Some fasteners and some electronics	Would play the game effectively at a lower level. (3rd robot on an alliance)
6		All electronics and most fasteners	Effective design that would most likely be a 2nd robot on an alliance but not a captain at a mid level regional. medium-level regional
7		All electronics, belts, fasteners and chains.	Lower Seed Alliance captain at a mid level regional. Very effective design but not top tier.
8		A fully complete model with hardware, chains/belts and correctly textured materials.	Higher seed alliance captain at mid level regional. Robot would most likely be very effective but not elite.
9		Extreme detail - Rivets, wires, sponsor logos, ect	Alliance captain at worlds. Can do everything in the game at a high level.
10			Elite Tier

Section 9: Glossary

Term	Definition
ALLIANCE	A cooperative of up to three (3) CADathon teams
ALLIANCE STATION	A 30 ft. (~914 cm.) wide by 10 ft. 9 $\frac{1}{8}$ in. (~328 cm.) to 12 ft. 10 $\frac{7}{8}$ in. (~393 cm.) deep infinitely tall volume formed by, and including the ALLIANCE WALL, the edge of the carpet, and ALLIANCE colored tape
ALLIANCE WALL	The ALLIANCE WALL is the structure that separates ROBOTS from DRIVERS, COACHES, and HUMAN PLAYERS. It consists of three (3) PLAYER STATIONS, the HUMAN PLAYER STATION, and the FIELD GOAL. ALLIANCE WALLS define the short edges of the FIELD, and along with the GUARDRAIL, prevent ROBOTS from exiting the FIELD during the MATCH
ARENA	All elements of the game infrastructure that are required to play GameDay: the FIELD, FOOTBALLS, WEIGHT PLATES, and all equipment needed for FIELD control, ROBOT control, and scorekeeping
BIN	A 23 $\frac{1}{2}$ in. diameter by 3 ft. tall cylindrical structure used to store FOOTBALLS to be recycled back onto the FIELD
BUMPERS	A required assembly which attaches to the ROBOT frame
BUMPER ZONE	The volume contained between the floor and a virtual horizontal plane 7 $\frac{1}{2}$ in. (~19 cm.) above the floor in reference to the ROBOT standing normally on a flat floor
COMPONENT	Any part in its most basic configuration, which cannot be disassembled without damaging or destroying the part or altering its fundamental function
CONTROL	A ROBOT is in CONTROL of a GAME PIECE if: A. The GAME PIECE is fully supported by the ROBOT,

	B. The GAME PIECE travels across the FIELD such that when the ROBOT changes direction, the GAME PIECE travels with the robot, or C. The ROBOT is holding a GAME PIECE against a FIELD element in an attempt to guard or shield it.
COTS	Commercial off the Shelf, a standard (i.e. not custom order) part commonly available from a vendor for all teams to purchase
DISABLED	The state in which a ROBOT is commanded to deactivate all outputs, rendering the ROBOT inoperable for the remainder of the MATCH
DRIVE COACH	A pre-college student or adult mentor member of the DRIVE Team who acts as a guide or advisor
DRIVER	A pre-college student member of the DRIVE TEAM who is an operator and controller of the ROBOT
DRIVE TEAM	A set of up to five (5) people from the same CADathon team responsible for team performance for a specific MATCH
ENDGAME	The final thirty (0:30) seconds of TELEOP
END ZONE	A 48 in. wide by 42 in. long infinitely tall triangular protected zone directly in front of the FIELD GOAL
FIELD	26 ft. 11¼ in. (~821 cm.) by 52. ft 5¼ in. (~1598 cm.) carpeted area bound by and including the inward and upward-facing surfaces of the GUARDRAILS and inward-facing surfaces of the ALLIANCE WALLS (except Chute surfaces and any surface beyond the face of the FIELD GOAL).
FIELD GOAL	A 12 ft. wide by 11½ in. tall U-shaped structure in which FOOTBALLS are scored. Similar to field goals used in the sport of football. The FIELD GOAL becomes progressively narrower as weights are added to the opponent's FIELD GOAL
FIELD STAFF	REFEREES, FTAS, or other staff working around the FIELD

FMS	The electronics core responsible for sensing and controlling the F4 CADathon FIELD. The FMS encompasses all FIELD electronics, including computers, REFEREE touchscreens, wireless access point, sensors, stack lights, E-Stops, etc.
FOOTBALL	A 7 in. diameter by 11 in. tall leather ball, similar to Wilson footballs.
FOUL	A credit of five (5) points towards the opponent's MATCH score
FRAME PERIMETER	Fixed, non-articulated structural elements of the robot contained within the BUMPER ZONE
FTA	A F4 Technical Advisor
GAME PIECE	FOOTBALLS and WEIGHT PLATES
GUARDRAIL	A system that consists of transparent polycarbonate supported on the top and bottom by aluminum extrusion. The GUARDRAIL prevents ROBOTS from inadvertently exiting the FIELD during a MATCH. There are four (4) gates in the GUARDRAIL that allow access to the FIELD for placement and removal of ROBOTS
HUMAN PLAYER	A pre-college student DRIVE TEAM member who acts as a GAME PIECE manager
HUMAN PLAYER CHUTE	A single sloped slot in the HUMAN PLAYER STATION 10 in. tall by 26 in. wide with the bottom of the opening resting 13 in. off of the playing floor
HUMAN PLAYER RETRIEVAL ZONE	A 53¾ in. long by 53¾ in. wide infinitely tall triangular protected zone directly in front of the HUMAN PLAYER STATION and HUMAN PLAYER CHUTE
HUMAN PLAYER STATION	A spot on the FIELD connected to the ALLIANCE STATIONS and part of the ALLIANCE WALL where ROBOTS can retrieve GAME PIECES from HUMAN PLAYERS during the MATCH
JUDGE	An official who is certified by F4 to score robot submissions in order to determine competition results
LANE	A 12½ ft. by 42 in. infinitely tall rectangular protected zone directly under the STATIONARY BAR

LIMBO BAR	A 111¼ in. long by 36 in tall bar with polycarbonate that is lowered as weights are removed
MATCH	A two (2) minute and fifteen (15) second period of time in which ALLIANCES play GameDay
MECHANISM	A COTS or custom assembly of COMPONENTS that provide specific functionality on the robot
OPERATOR CONSOLE	The set of COMPONENTS and MECHANISMS used by the DRIVERS and/or HUMAN PLAYER to relay commands to the ROBOT
PINNING	Preventing the movement of an opponent ROBOT by contact
PLAYER STATION	One (1) of three (3) assigned positions in an ALLIANCE WALL from where a DRIVE TEAM operates their robot
RED CARD	A penalty assessed for egregious ROBOT or team member behavior or rule violations which results in a team being DISQUALIFIED for the MATCH
REFEREE	An official who is certified by F4 to enforce the rules of GameDay
ROBOT	An electromechanical assembly designed by the CADathon team to play the current season's game and includes all the basic systems required to be an active participant in the game: power, communications, control, BUMPERS, and movement about the field
RP	A Ranking Point
RS	The Ranking Score
RSL	A ROBOT Signal Light
SCORING PEG	A 1 in. diameter rod on each FIELD GOAL on which WEIGHT PLATES are placed
STARTING CONFIGURATION	The physical configuration in which a ROBOT starts a MATCH
STATIONARY BAR	A 44½ in. long bar that is fixed at a height of 36 in. above the LANE

SURROGATE	A team randomly assigned by the FIELD Management System to play an extra Qualification MATCH
TECH FOUL	A credit of fifteen (15) points towards the opponent's MATCH score
TECHNICIAN	A pre-college student member of the DRIVE TEAM who is a resource for ROBOT troubleshooting, setup, and removal from the FIELD
TELEOP	The main phase of each MATCH is called the Teleoperated Period (TELEOP) and consists of the entire two minutes and fifteen seconds (2:15)
TIMEOUT	A period of up to six (6) minutes between MATCHES which is used to pause Playoff MATCH progression
WEIGHT PLATE	A 2¼ in. inner diameter by 17½ in. outer diameter by 1⅜ in. tall plate with a weight of 10 lbs.
WEIGHT PLATE RETRIEVAL ZONE	A 24 in. long by 36 in. wide infinitely tall triangular protected zone directly in front of the center edge of the LIMBO BARS
YELLOW CARD	A warning issued by the Head REFEREE for egregious ROBOT or team member behavior or rule violations. A subsequent YELLOW CARD within the same tournament phase results in a RED CARD

