



7 Game Rules

7.1 Before the MATCH

G01. Know your ROBOT setup. When placed on the FIELD for a MATCH, each ROBOT must be:

- A. in compliance with all ROBOT rules, i.e. has passed Inspection (for exceptions regarding Practice MATCHES, see [Section 9 Inspection & Eligibility Rules](#)),
- 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, and
- F. supporting not more than 10 FUEL and 1 GEAR (as described in [Section 4.2 MATCH Setup](#)).

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.

If a ROBOT is BYPASSED prior to the start of the MATCH, the DRIVE TEAM may not remove the ROBOT from the FIELD without permission from the Head REFEREE or the *FIRST*® Technical Advisor (FTA).

G01-1. Know your ROPE setup. If a Team is using their own ROPE, it must be stowed using the ROPE retention strap and/or loop pad such that it is not deployed.

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 FIELD STAFF will install a default ROPE.

G02. Be prompt/safe when coming to and going from the FIELD. DRIVE TEAMS may not cause significant or repeated delays to the start of a MATCH and/or to the FIELD reset at the conclusion of 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:

- E. late arrival to the FIELD
- F. failing to exit the FIELD once the LED strings have turned off (indicating MATCH ready)
- G. installing BUMPERs, charging pneumatic systems, or any other ROBOT maintenance, once on the FIELD
- H. use of alignment devices that are external to the ROBOT
- I. failing to remove OPERATING CONSOLES from the PLAYER STATIONS in a timely manner
- J. convoluted installation and removal of TEAM supplied ROPE





- G03. Know your DRIVE TEAM positions.** Prior to the start of the MATCH, DRIVE TEAMS must be positioned as follows:
- A.** DRIVERS and COACHES must be in their ALLIANCE STATION and behind the STARTING LINE
 - B.** At least one (1) PILOT must be on their AIRSHIP (please refer to [Section 4.5 DRIVE TEAM](#) for details regarding which DRIVE TEAMS provide the PILOT(S))
 - C.** HUMAN PLAYERS (that are not PILOTS) must be behind the STARTING LINE and in their ALLIANCE STATION or LOADING LANE

Violation: MATCH will not start until the situation is corrected.

7.2 ROBOT Restrictions

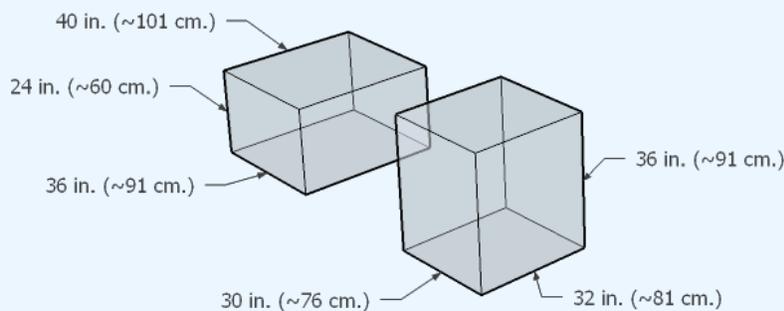
- G04. Don't overextend yourself.** A ROBOT may not exceed the volume for which it passed Inspection during the MATCH.

Violation: FOUL. If strategic, (e.g. expansion results in the TOUCHPAD being triggered), RED CARD.

The two (2) distinct ROBOT volumes permitted are defined in R03 and included below for reference:

- A.** 36 in. by 40 in. by 24 in. tall (~91 cm by 101 cm by 60 cm tall)
- B.** 30 in. by 32 in. by 36 in. tall (~76 cm by 81 cm by 91 cm tall)

Figure 7-1: Permitted ROBOT volumes



These measurements are intended to be made as if the ROBOT is resting on a flat floor, not relative to the height of the ROBOT from the FIELD carpet.

As a result, a ROBOT that fits in one of the permitted volumes and has climbed a ROPE such that its highest point is 4 ft. (~122 cm) from the floor has not violated G04 as it is not considered 4 ft. (~122 cm) tall.

Additionally, a ROBOT that is angled as it climbs a rope (such that a diagonal of length that exceeds the volume's height restriction becomes vertical), does not violate G04, assuming that if it's virtually transposed to a flat floor without changing configuration, it's within its permitted volume.





G05. Keep your BUMPERS together. ROBOTS must be in compliance with BUMPER Rules throughout the MATCH.

Violation: FOUL. DISABLED if any BUMPER segment becomes completely detached or the Team number or ALLIANCE color becomes indeterminate.

G06. ROBOTS must be removed from the FIELD by hand (i.e. no enabling, power, etc.). 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.

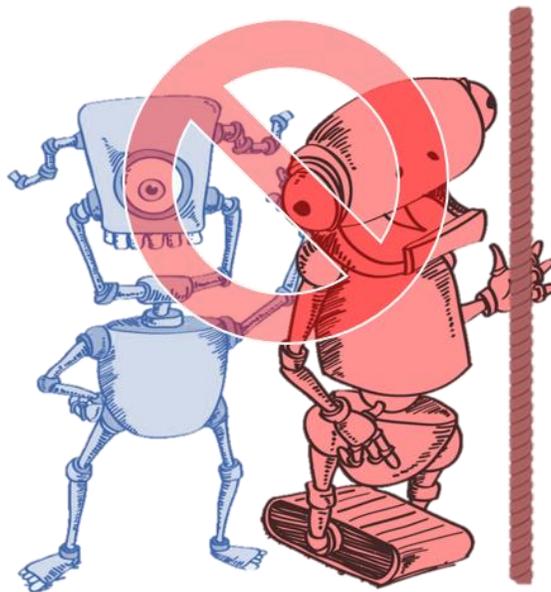
Violation: YELLOW CARD.

Tethering includes any wired or wireless connection used to electrically energize and/or control elements on the ROBOT. The safety of Teams and Volunteers in close proximity to ROBOTS and ARENA elements on the FIELD is of the utmost importance, therefore ROBOTS or ROBOT COMPONENTS may not be energized or powered in any way on the FIELD once the MATCH has concluded.

7.3 ROBOT to ROBOT Interaction

G07. Opponent touching their ROPE: don't touch them. ROBOTS may not contact an opposing ROBOT, regardless of who initiates the contact, if the opposing ROBOT is in contact with one of its own ALLIANCE'S ROPES.

Figure 7-2: Don't touch opponents touching their ROPES.



Violation: The opposing ROBOT is considered to have triggered an un-triggered TOUCHPAD at the end of the MATCH.

Teams are encouraged to consider rule C08 when developing their strategies, such as attempting to draw violations of this rule.



- G08. Don't tear others down to lift yourself up.** Strategies aimed at the destruction or inhibition of ROBOTS via attachment, damage, tipping, entanglements, or deliberately putting a GEAR on an opponent's ROBOT are not allowed.

Violation: FOUL and YELLOW CARD. If harm or incapacitation occurs as a result of the strategy, RED CARD

- G09. Stay out of other ROBOTS.** Initiating deliberate or damaging contact with an opponent ROBOT on or inside the vertical extension of its FRAME PERIMETER is not allowed.

Violation: FOUL and YELLOW CARD.

- G10. Don't collude with your partners to shut down major parts of game play.** Two or more ROBOTS may not isolate or close off any major facet of MATCH play, e.g. block all three opponent LIFTS, shut down all access to GAME PIECES, quarantine 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 G10.

- G11. There's a 5-count on pins.** ROBOTS may not pin an opponent's ROBOT for more than five (5) seconds. A ROBOT will be considered pinned until the ROBOTS have separated 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: If pinning ROBOT is not in the opponent's KEY, FOUL, plus an additional FOUL for every five (5) seconds in which the situation is not corrected. If pinning ROBOT is in the opponent's KEY, TECH FOUL, plus an additional TECH FOUL for every five (5) seconds in which the situation is not corrected. In either scenario, if extended and egregious, RED CARD.

There is no *FIRST*® Robotics Competition specific definition of pin, so a general definition applies; "to prevent or stop something from moving." As a result, contact is not required for pinning to occur. For example, a ROBOT parked right behind an opponent that is between dividers could be considered pinning because the dividers and the parked ROBOT prevent the opponent from moving.

Generally, pins that exceed fifteen (15) seconds are considered extended and egregious, regardless of a pinning ROBOT's mobility, however circumstances vary and the assessment is open to REFEREE discretion.

- G12. If an opponent's down, back off.** 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.

- G13. Don't mess with a ROBOT in their RETRIEVAL ZONE.** A ROBOT with any part inside its opponent's RETRIEVAL ZONE may not contact an opposing ROBOT, regardless of who initiates the contact.

Violation: TECH FOUL.





TEAMS should take note that they are putting themselves at great risk for FOULS if they choose to enter their opponent's RETRIEVAL ZONE.

G14. Don't climb on each other. Unless attempting to right a fallen (i.e. tipped over) ALLIANCE partner, ROBOTS may neither fully nor partially support the weight of other ROBOTS on the same ALLIANCE strategically or repeatedly.

Violation: RED CARD.

7.4 FIELD Interaction

G15. Be careful about what you grab on to. DRIVE TEAMS, ROBOTS, and OPERATOR CONSOLES are prohibited from the following actions with regards to interaction with ARENA elements.

Items A and B exclude DRIVE TEAM interaction with FIELD elements in their areas.

Item C excludes use of the PLAYER STATION hook-and-loop tape, plugging in to the provided power outlet, and plugging the provided Ethernet cable in to the OPERATOR CONSOLE.

Items A-E exclude GAME PIECES.

Items A-G exclude ROPES installed on an ALLIANCE'S AIRSHIP.

Items A-H exclude a ROBOT'S interaction with a Team supplied ROPE that doesn't litter the FIELD.

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

Violation: If prior to MATCH, and situation can be corrected quickly, it must be remedied before the MATCH will start. If during a MATCH, FOUL. If during a MATCH and extended or repeated, YELLOW CARD. If offense is via a ROBOT and the Head REFEREE determines that further damage is likely to occur, offending ROBOT will be DISABLED. Corrective action (such as eliminating sharp edges, removing the damaging MECHANISM, and/or re-Inspection) may be required before the ROBOT will be allowed to compete in subsequent MATCHES.

GAME PIECES are expected to undergo a reasonable amount of wear and tear as they are handled by ROBOTS, such as scratching or marking. Gouging, tearing off pieces, or routinely marking GAME PIECES are violations of this rule. Humans causing GAME PIECE wear and tear, e.g. flattening FUEL, are subject to a CARD per [Section 10.7 YELLOW and RED CARDS](#).

A ROBOT that has only unseated the TOUCHPAD dome has not damaged the FIELD.

GEARS placed in a BOILER will damage the BOILER internal elements and such an action is considered an egregious violation of G15.



G16. Keep it together. ROBOTS may not intentionally detach or leave parts on the FIELD.

Violation: RED CARD

This rule is not intended to penalize ROBOTS that encounter accidental breakage (e.g. a failed MECHANISM that falls off), as those actions are not intentional.

G17. Opponent's KEY: a no parking zone. A ROBOT may not be in their opponent's KEY for more than five (5) seconds (if the ROBOT is breaking the plane of the line with BUMPERS, it is considered in the KEY).

A ROBOT that is being pinned is exempt from G17. Once the pin is over, the G17 5-second count begins.

Violation: FOUL. For every five (5) seconds in which the situation is not corrected, FOUL.

In a scenario where a ROBOT is pinning (per G11) and in the opponent's KEY, REFEREES are instructed to disregard G17 so they can focus on the pinning.

G18. One ROBOT per ROPE. No more than one (1) ROBOT may be fully supported by a ROPE.

Violation: RED CARD.

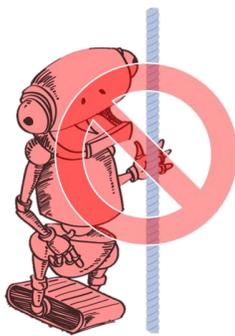
G19. Only climb on deployed ROPES. A ROBOT may only pull on a ROPE if/once the ROPE is supported only by the DAVIT, the carpet, the ROBOT, or any combination thereof.

Violation: RED CARD.

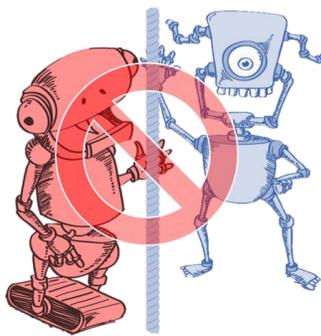
G20. Let 'em climb: don't touch their ROPES. During the final thirty (30) seconds of a MATCH, ROBOTS may not contact an opposing ALLIANCE'S ROPE.

Figure 7-3: Don't touch opponents' ROPES in the final thirty (30) seconds of the MATCH.

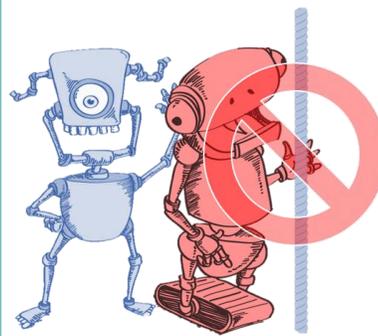
Ex. A:
Contact opponent's ROPE, FOUL



Ex. B:
Contact opponent's ROPE, opponent contacts same ROPE, opponent gets a triggered TOUCHPAD.



Ex. C:
Contact opponent's ROPE, opponent contacts you, opponent gets a triggered TOUCHPAD.



Violation: FOUL. If an opposing ROBOT contacts the offending ROBOT or the ROPE, the opposing ROBOT is considered to have triggered an un-triggered TOUCHPAD at the end of the MATCH.



G20-1. ROBOTS gotta climb. A ROBOT may only signal they're "Ready for Takeoff" by climbing a ROPE.

Violation: RED CARD

'Climbing a ROPE' means ascending using a ROPE.

A ROBOT may supplement the climbing action by using an extension that reaches out to trigger a TOUCHPAD (assuming, of course, ROBOT size restrictions are still met), but climbing must be part of the triggering action.

Figure 7-4: Use of FIELD geometry to signal a ROBOT is "Ready for Takeoff" without climbing the ROPE is an example of a violation of G20-1.



7.5 GAME PIECE Interaction

G21. GAME PIECES: use as directed. ROBOTS may not deliberately use GAME PIECES, e.g. GEARS, in an attempt to ease or amplify the challenge associated with other FIELD elements, e.g. BOILERS, HOPPERS, or ROPES.

Violation: YELLOW CARD.

G22. Keep GAME PIECES in bounds. ROBOTS may not intentionally eject GAME PIECES from the FIELD other than through BOILERS.

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

G23. Shoot FUEL from your own LAUNCHPAD. A ROBOT may only LAUNCH FUEL while in their LAUNCHPAD (i.e. at least breaking the plane of the line with BUMPERS).





For the purposes of *FIRST*® STEAMWORKSSM, LAUNCHING is defined as shooting in the air, kicking or rolling across the floor with an active mechanism, or throwing in a forceful way.

A ROBOT that has bumped FUEL has not LAUNCHED it.

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

G24. Don't throw GEARS at all. A ROBOT may not LAUNCH a GEAR.

Violation: YELLOW CARD.

G25. AIRSHIPS run on steam, not FUEL. ROBOTS may not intentionally put FUEL in an AIRSHIP.

Violation: YELLOW CARD.

G26. If you're going to deliver GEARS, you have to use a LIFT. Any GEAR transferred from a ROBOT to a PILOT during the MATCH must be done so via a LIFT.

Violation: TECH FOUL and a YELLOW CARD.

G27. One-GEAR limit. ROBOTS may not control more than one GEAR at a time.

Violation: FOUL. If strategic, TECH FOUL and YELLOW CARD.

Moving or positioning a GEAR to gain advantage is considered "control." Examples include, but are not limited to:

- A. "carrying" (holding a GEAR inside a ROBOT)
- B. "herding" (intentionally pushing a GEAR to a desired location or direction)
- C. "trapping" (holding a GEAR against a FIELD element in an attempt to shield or guard it)

Examples of interaction with GEARS that are not "control" include, but are not limited to:

- A. "bulldozing" (inadvertent contact with GEARS while in the path of the ROBOT moving about the FIELD)
- B. "deflecting" (being hit by a GEAR that bounces into or off of a ROBOT).

If a GEAR becomes lodged in or on a ROBOT, it will be considered controlled by the ROBOT. It is important to design your ROBOT so that it is impossible to inadvertently or unintentionally control more than the allowed maximum.

G28. Don't use air to direct/redirect FUEL. ROBOTS may not use forced air to affect the movement of FUEL that is outside the volume of the ROBOT.

Violation: RED CARD.



7.6 AUTO Period Rules

- A01. Behind the lines.** During AUTO, DRIVE TEAM members in ALLIANCE STATIONS and LOADING LANES may not contact anything in front of the STARTING LINES, unless for personal or equipment safety.

Violation: FOUL.

Pointing, gesturing or otherwise extending across the STARTING LINE such that contact is not made with carpet or other ARENA elements is not a violation of this rule.

One example of an exception for equipment safety is if an OPERATOR CONSOLE starts to slide from the PLAYER STATION shelf. In that circumstance, DRIVE TEAM members may step forward to catch it and return it. However, if an OPERATOR CONSOLE has already hit the ground, the damage has already been done, and touching it before TELEOP starts is not an exception for equipment safety.

- A02. During AUTO, let the ROBOT do its thing.** During AUTO, DRIVE TEAMS may not directly or indirectly interact with ROBOTS or OPERATOR CONSOLES unless for personal safety, OPERATOR CONSOLE safety, or pressing an E-Stop for ROBOT safety.

Violation: FOUL and YELLOW CARD.

- A03. Disconnect or set down controllers.** During AUTO, any control devices worn or held by the DRIVERS and/or HUMAN PLAYERS must be disconnected from the OPERATOR CONSOLE.

Violation: FOUL.

- A04. Stay out of your opponent's LAUNCHPAD.** During AUTO, no part of a ROBOT'S BUMPERS may enter their opponent's LAUNCHPAD.

Violation: FOUL. If contact is made with an opponent ROBOT in their LAUNCHPAD (either direct contact or transitive contact through another object), TECH FOUL.

- A05. PILOTS: don't take the "free" GEAR yet.** During AUTO, PILOTS may not remove the reserve GEAR from the starting position in which it begins the MATCH.

Violation: TECH FOUL.

7.7 Human Action Rules

- H01. COACHES and other Teams: hands off the controls.** A ROBOT shall be operated solely by the DRIVERS and/or HUMAN PLAYERS of that Team.

Violation: Offending ROBOT will be DISABLED.

Exceptions may be made before a MATCH for major conflicts, e.g. religious holidays, major testing, transportation issues, etc.

- H02. Wireless devices not allowed.** During a MATCH, DRIVE TEAMS may not use electronic devices which have the capability of receiving communications from persons outside of the ARENA (e.g. cell phones or wearable technology).

Violation: YELLOW CARD.

- H03. Leave FIELD scoring elements alone.** Teams may not interfere with any automated scoring hardware.





Violation: RED CARD for the ALLIANCE.

Examples of violations of this rule include, but are not limited to, tampering with the sensors, putting anything but a GEAR in the GEAR slot for ROTOR 1, blocking FUEL from exiting the BOILER, or attempting to feed FUEL backwards through a BOILER.

H04. By invitation only. Only DRIVE TEAMS for the current MATCH are allowed in their respective ALLIANCE STATIONS, LOADING LANES, and AIRSHIPS.

Violation: MATCH will not start until the situation is corrected.

H05. Identify yourself. DRIVE TEAMS must wear proper identification while in the ARENA. Proper identification consists of:

- A. All DRIVE TEAM members wearing their designated buttons above the waist in a clearly visible location at all times while in the ARENA.
 - i. The COACH wearing the "Coach" labeled drive team button
 - ii. The DRIVERS and HUMAN PLAYERS each wearing a DRIVE TEAM button
- B. During a Playoff MATCH, the ALLIANCE CAPTAIN clearly displaying the designated ALLIANCE CAPTAIN identifier (e.g. hat or armband).

Violation: MATCH will not start until the situation is corrected. Those not displaying identification must leave the ARENA.

H06. COACHES, no GAME PIECES. COACHES may not touch GEARS or FUEL unless for safety purposes.

Violation: FOUL.

H07. No wandering. DRIVE TEAM members may not contact anything outside the zone in which they started the MATCH (e.g. the AIRSHIP, LOADING LANE, or ALLIANCE STATION) during the MATCH. Exceptions will be granted for inadvertent, momentary, and inconsequential infractions and in cases concerning safety.

Violation: FOUL. If strategic, RED CARD.

H08. GAME PIECES through LOADING STATIONS only. ALLIANCES may only deliberately cause GAME PIECES to leave an ALLIANCE STATION or LOADING LANE

- A. during TELEOP,
- B. by a HUMAN PLAYER or DRIVER, and
- C. through a LOADING STATION slot.

Violation: FOUL per GAME PIECE. If strategic, RED CARD.

H09. PILOTS, keep the GEARS. PILOTS may not throw GEARS from the AIRSHIP.

Violation: RED CARD.

Accidentally dropping a GEAR is not a violation of H09.

H10. GEARS stay installed. Once a ROTOR is started, the PILOT may not remove any GEARS used to start it.

Violation: RED CARD.

H11. Don't release ROPES early. PILOTS may not deploy ROPES (i.e. cause a ROPE to extend below the deck of the AIRSHIP) until there are 30 or fewer seconds left in the MATCH.





Violation: FOUL. If deployed with more than 35 seconds left in the match, TECH FOUL.

The ARENA will sound an alert when thirty (30) seconds remain in TELEOP.

- H12. You can't bring/use anything you want.** The only equipment that may be brought to the ARENA and used by DRIVE TEAMS during a MATCH is listed below. Regardless if equipment fits criteria below, it may not be employed in a way that breaks any other rules, introduces a safety hazard (e.g. a step stool or large signaling device in the confined space of the AIRSHIP are safety concerns), blocks visibility for FIELD STAFF or audience members, or jams or interferes with the remote sensing capabilities of another Team, including vision systems, acoustic range finders, sonars, infrared proximity detectors, etc. (e.g. including imagery that, to a reasonably astute observer, mimics the Vision Guides).
- A. the OPERATOR CONSOLE,
 - B. BANNERS and devices, if needed, to assist placement in the BANNER Holder,
 - C. non-powered signaling devices,
 - D. reasonable decorative items,
 - E. special clothing and/or equipment required due to a disability
 - F. devices used solely for the purpose of planning or tracking strategy or devices used solely to record gameplay, provided they meet all of the following conditions:
 - i. do not connect or attach to the OPERATOR CONSOLE
 - ii. do not connect or attach to the FIELD or ARENA
 - iii. do not connect or attach to another ALLIANCE member
 - iv. do not communicate with anything or anyone outside of the ARENA.
 - v. do not include any form of enabled wireless electronic communication (e.g. radios, walkie-talkies, cell phones, Bluetooth communications, Wi-Fi, etc.)
 - vi. do not in any way affect the outcome of a MATCH, other than by allowing PLAYERS to plan or track strategy for the purposes of communication of that strategy to other ALLIANCE members.
 - G. non-powered Personal Protective Equipment (examples include, but aren't limited to, gloves, eye protection, and hearing protection)

Violation: MATCH will not start until situation remedied. If discovered or used inappropriately during a MATCH, TECH FOUL.

- H13. FUEL overboard? Only out the PORT.** In a circumstance where FUEL gets in an AIRSHIP, the only way a PILOT may remove it is by dropping it through the PORT.

Violation: FOUL per FUEL.

- H14. You have to use the CRANK.** PILOTS may only start ROTORS 2, 3, and 4 by turning the CRANK installed in the first GEAR in the set.

Violation: YELLOW CARD.





H15. Seriously, GEARS stay installed. A pre-populated GEAR may not be removed from its AXLE.
Violation: RED CARD.

