



U.S. Drone Soccer

Condensed Ruleset

2025 Season - update

FAI F9A - 20cm Drone Soccer Gameplay

It is recommended that all coaches, pilots, and administrators read this condensed ruleset to enhance play and competition for all.

U.S. Drone Soccer Requirements

Fielding Diverse Coed Teams - All teams must intentionally create and maintain a welcoming and supportive environment for new pilots, and ensure representation and participation of all genders and abilities. Encourage and welcome communities historically excluded from aviation into the program. Teams without at minimum one male and one female pilot per set are not eligible to advance in tournaments.

Respect and Anti-Harassment - All players have the right to equal participation and respect without fear, bullying, intimidation, or belittlement. We maintain a zero-tolerance policy for bullying, racism, bigotry, and sexual harassment. It is a violation of this policy to retaliate against any person who asserts their rights regarding harassment.

Safe Aircraft Operation - Each pilot and crew member must take responsibility for the condition and operation of their drones and equipment. All flights should be conducted in a netted arena or designated practice area. Reckless flight or intentional damage to other teams or players will not be tolerated. Participants must practice good situational awareness to ensure the safety of themselves and others.

Anonymous Reporting - Mirroring practices in professional aviation, all concerns about unsafe situations or inappropriate conduct can be anonymously provided to league administrators. Please include your contact information and a description of your concerns to reporting@usdronesoccer.org Personally identifying information will be kept confidential unless prior consent is obtained, or the situation involves a suspected crime or threat to public safety that must be reported to law enforcement.

Integrity & Fair Play - Teams cannot interfere with the equipment or operations of other teams. Examples of prohibited activities include radio frequency interference or jamming, hacking, distraction, disruptive chatter, eavesdropping, or tampering with equipment.

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1. INTRODUCTION

1.1 Manual and Checklist Use

Manuals and checklists are written in a specific order, and doing those actions in order is important. Consistent checklist use is a sign of a disciplined and competent aircrew. Steps that must be done in order will be numbered. These steps apply to all crew unless specified (P for Pilot, and R for Referee). A separation indicates the Cue on the left ... and the Action to be taken on the right. Items with a Verbal Response are in quotations. Every time you complete an Action, you should Verify the results of that action, items to check and verify are listed with bullets.

For Example:

1. ON COMMAND (R).....“ARM YOUR DRONES”
2. THROTTLE (P).....IDLE
3. RADIO ARMING SWITCH (P).....ON
 - Verify propellers are spinning at idle power

1.2 Warnings, Cautions, and Notes

These statements are used throughout this manual to emphasize important and critical information.

⚠ WARNING:

A procedure that may result in personal injury or property damage if not carefully followed.

⚠ CAUTION:

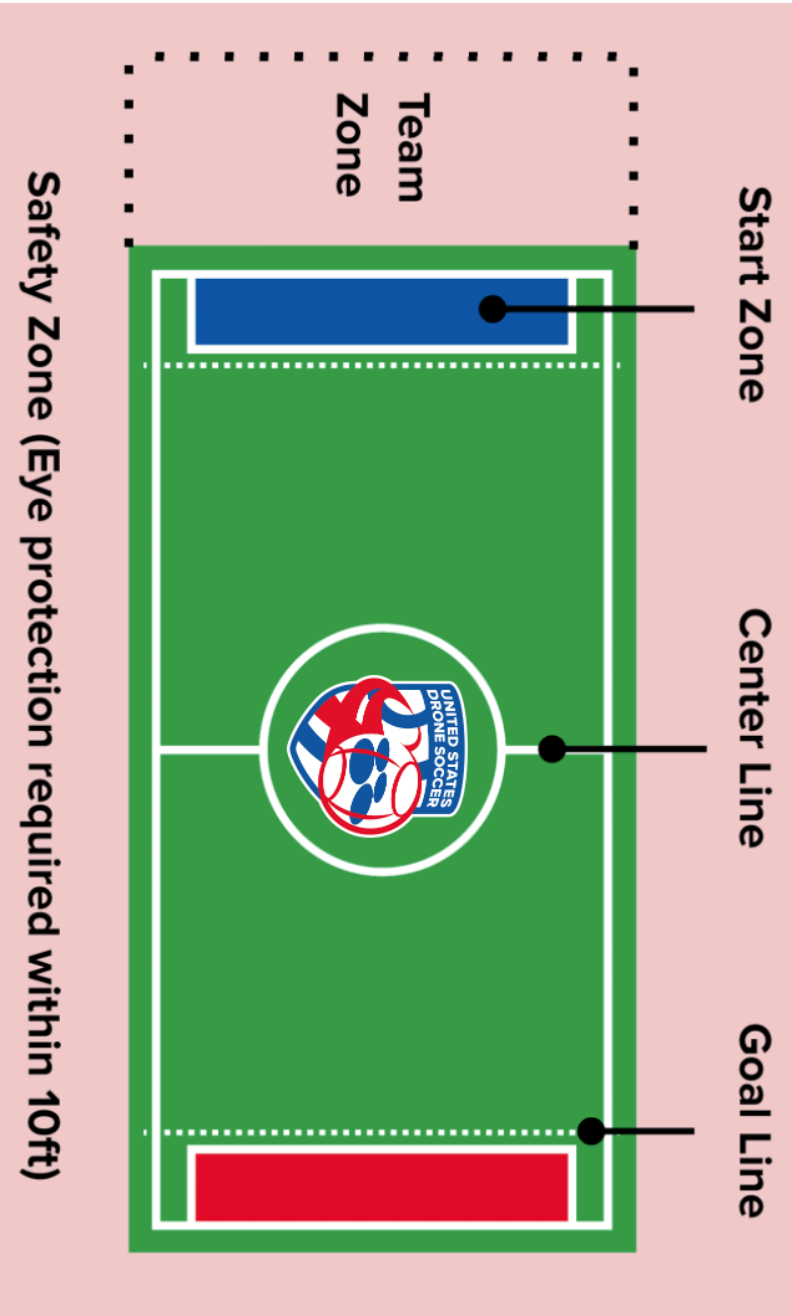
A procedure that may result in damage to equipment if not carefully followed.

Note:

Information that is essential, and often related to safety.

1.3 Terminology and Abbreviations

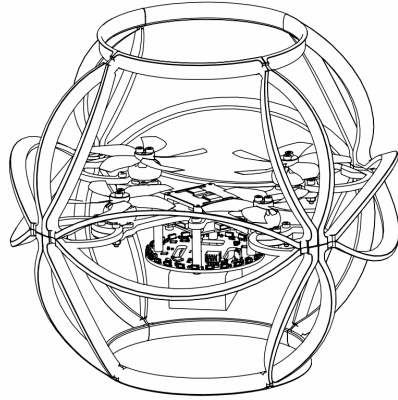
Arena	Playing area within a netted enclosure of 10x10x20ft.
Arm	Switch on the transmitter that activates the drone motors.
Cells	The number of smaller batteries wired in a series, S for series e.g. 4 S = 4 cell battery.
Center Line	The center of the Arena that separates offensive and defensive zones.
Coach/Manager	Adult leaders who guide a Team.
Crew/Roster	The entire Team (includes members not actively flying).
Disarm	Deactivate motors through switch on transmitter to stop aircraft motors from turning.
Drone	Shorthand for Drone Soccer Ball or UAS.
FAI	Federation Aeronautique Internationale (World Air Sports Federation) governing body on aviation.
Match	A Match consists of three Sets and two repair intervals.
Player/Pilot	Crew Member operating aircraft as an active player.
Organization	A school or program registered with U.S. Drone Soccer and listed in LeagueOS at Fly.DroneSoccer.US
Teams	List of students under an Organization (no more than 10).
Team Captain	The only active Pilot & spokesperson in a Set who communicates with officials.
Crew Members	The recognized list of Coaches & Pilots for a given competition (no greater than 12 including coaches).
Active Players	The recognized list of pilots for a given Match.
Radio	Short for radio control transmitter.
Set	A gameplay interval of three minutes elapsed time.
Start Zone	The beginning of Set launch area in front of pilots.
Team Zone	Rectangular area for Pilots at each end of the Arena.



2. AIRCRAFT & EQUIPMENT SPECIFICATIONS

2.1 Drone Soccer Ball Aircraft Specifications

designed according to FAI F9A-B sporting code. Drones may be modified but must stay within the following specifications:



Maximum Total Weight: **300g** including battery

Exoskeleton frame Diameter **20cm ± 2cm**

(Exoskeleton may be made of anything but metal)

Maximum Base Truncation: **2cm**

Batteries: **3S or 4S** (number of cells in each battery)

Max Voltage Per Battery Cell: **4.2V**

Max Propeller Diameter: **7.6cm**

Radio Control (RC) Spectrum: **2.4 GHz**

2.2 Required Batteries

3S-4S Lithium Polymer Battery at any milliamp hour (mah) rating.

No LiHV batteries in 2025.

2.3 Aircraft LEDs

Teams will be assigned red or blue LED designations for a given match. Aircraft LEDs must be switched to the assigned red or blue using that aircraft's transmitter. At least one LED on the left and the right sides of the aircraft must display the assigned color in order to compete in that set. Drones without fully functional LED boards are not allowed to compete. Drone LED boards damaged during a Set may continue flight for the remainder of the Set.

2.4 Equipment Requirements and Identification

⚠ WARNING:

Protective eyewear must be worn inside the Safety Area within ten feet of any arena, and while working at team repair tables.

Note:

All Team equipment must be labeled with an assigned team number. This includes drones, radios, batteries, and supplies.

Note:

At formal competitions, all batteries must have a team number for acceptance by charging station staff.

Teams are responsible for their own misplaced or mislabeled equipment.

2.5 Recommendations

Competitive teams may paint their exoskeleton cages using plastic paint.

3. TEAM COMPOSITION & PREPARATION

3.1 Team Composition

Drone Soccer is a coed (mixed) sport and teams must maintain a diverse and inclusive roster. Teams engaged in a formal U.S. Drone Soccer competition (District Championship and National Championship) are required to field a diverse team with male and female pilots competing in the first two sets of any Match.

A regulation Match is played by five active players, although teams and match officials can agree to play with equal teams of smaller size as necessary.

A team competing in a tournament with only four players can either forfeit their match or play shorthanded.

Each Team may have a maximum of ten players.

3.2 Pilot Substitutions

Only active players are allowed in the Team Zone during gameplay. Active pilots may not be changed during a Set. Pilot substitutions are allowed between Sets.

Pilots may not swap aircraft or radio controllers during a Set.

3.3 Protective Equipment

All players and referees must wear glasses (prescription with or without side-shields are allowed) or protective eyewear when within 10ft of the arena during active gameplay.

3.4 Battery Charging Responsibilities

- All batteries must be labeled with proper team numbers.
- All batteries should arrive at competition fully charged.
- Pilots will not apply battery power to a drone outside of a netted arena.
- Teams will not charge batteries in the venue.
- Batteries will only be charged in a designated charging area by designated staff.
- Designated staff always reserves the right to confiscate any puffy, damaged, or questionable battery from competition and into a safe situation.
- Teams must bring 4 fully charged batteries per aircraft to any competition.

3.5 Tournament Preparation

Teams must be prepared for Equipment Inspection (FAI Model Processing) where each competition aircraft will be inspected by designated staff for airworthiness and adherence to technical specifications.

Equipment Inspection (FAI Model Processing)

- Checking the integrity of aircraft exoskeleton, softly rotating the drone ball with two hands to confirm zip ties are tight.
- Checking for non-sharp edges to zip ties.
- Checking for zip tie bodies not protruding from the airframe.
- Check that the aircraft receiver body is firmly attached to the airframe and not flopping.
- Confirming all screws are firmly tightened.
- All up weight (aircraft and battery) at 300 grams or less.
- The organizer will mark each registered model with an easily visible identification such as a sticker.

District Championships will be conducted with the following referee configuration:

One Head Referee: Confirm with field referees that teams are ready to start each set.

Two Score Keepers: Enter live scores into the scoreboard. Write score on scoresheet.

Two Goal Judges: One referee works with each Team in a Match. Raises and lowers flags for scores while confirming that the entire Team has retreated to the midpoint after each score by the striker. Upon making a goal, the Goal Judge will raise the flag of the same color of the Striker that made a goal. Once that Team has completed offsides, the Goal Referee will lower their flag signaling the Striker of that Team is eligible to score again.

Two Field Referees: One referee works with each Team in a Match. Each referee will carry from the referee table into the area of each Team's competing group of drone balls. The referee will plug in each aircraft battery prior to the start of a Set, then the referee will confirm with each Pilot that the aircraft will properly arm. The referee will leave the arena and is responsible for making sure the arena door is zipped or closed. That referee is then also responsible for watching gameplay and identifying and calling out penalties when and if they occur.

3.6 Match Preparation

Players arriving at the Team Zone will only bring their drones (one spare drone per Pilot), transmitters (equal to the number of drones brought to the Team Zone), and batteries (equal to the number of drones brought to the Team Zone). Players may not bring spare parts and tools to the Team Zone. Players may not repair drones in the Team Zone.

Teams are responsible for ensuring their drones are ready to fly.

Teams are responsible for making their drones able to change LED colors between Blue or Red through a switch on their transmitter/radio.

Teams will be assigned either Red or Blue colors in any match.

All drones must be either Blue or Red and non-working LED boards will disallow that aircraft to compete in the Set.

Teams are responsible for arriving at a Set with charged batteries strapped to the aircraft and NOT plugged in.

Each pilot must place their aircraft on the Team Zone table at their side of the arena. The referee will carry the aircraft into the arena to then plug in each aircraft prior to the start of a Set.

Only referees may enter the arena.

4. RULES OF PLAY

4.1 Match Format & Results

Each Match consists of three 3-minute Sets, with two 5-minute repair intervals.

A winner is determined for each *Set* based on the highest number of goals scored.

The winner of each *Match* is determined by the best 2 out of 3 Sets.

4.2 Set Tiebreaker/Sudden Death

In the event of a tied score at the end of a three-minute Set, the winner is determined by immediate sudden death. Sudden death is one Striker versus one Striker with no defenders. Both Strikers are placed within their respective starting areas. Arming and liftoff is announced by the referee. The first Striker to score a goal wins that set for their team.

If the score remains tied and one Striker is unable to fly, then the remaining flying Striker's team is declared winner of that Set.

Both Strikers will use the same batteries they had just flown with. If both Strikers are unable to fly in a Set and the Set ends, then both Strikers will fly in sudden death competition in a new Set with replacement Drones.

4.3 Positions

Only the Striker on each Team can score. They must be clearly identified with Striker flags. Other than the Striker, the four defensive positions are fluid and can trade responsibilities: Forward, two Sweepers, and Keeper.

4.4 Team Captain

Each team must designate a Captain who is the spokesperson for the Team during each set. Only Captains and affected pilots may interact directly with Referees during competition. A team captain *must* be an active pilot for that Set.

4.5 Scoring

A point will be awarded each time a Striker successfully flies through their opponent's goal in the forward direction. The drone must pass completely through the goal. The Striker cannot pass backward through the goal in an attempt to score.

4.6 Offsides

After a successful goal, the Striker and all other Active Pilots on that Team must retreat back to the centerline before that Striker is eligible to score again. A downed aircraft is not required to retreat to the halfway point if they are unable to fly.

The Goal Judges will keep their flag raised until all teammates have individually crossed the centerline establishing the Team as eligible to score.

No additional points may be earned until all active pilots have retreated to the halfway mark to attempt another offensive.

4.7 Penalties

Direction of Flight - The Striker cannot fly through the other team's goal from the back. This will result in a penalty.

Drones that fly through any goal in the forward direction will not be awarded or penalized.

Goaltending - Defenders are not allowed to hover within their goal or fly through their goal in the reverse direction. All drones that enter at least halfway through a goal must fly out and around to return to play.

Controlled Flight - Drones must be flown under control to the best of a player's ability. Reckless flight that intentionally causes damage to other drones or the arena may result in penalties and/or removal from the game. Disabled or damaged drones should be immediately disarmed to prevent further damage.

Interference - Only the referee can physically interact with drones inside the arena. No player, coach, or spectator may touch a drone through the arena netting. This may result in removal from the pilot area or disqualification from the match or set.

Early Start - Players will await the referee's signal to arm their drones and begin flight. Whilst armed, drones must remain grounded until the start signal begins the Set. Penalties will be given to pilots who fail to remain grounded until the signal to begin is given.

Misconduct - Players, coaches, and spectators must exhibit respectful conduct at all times (refer to coach, player, and spectator code of conduct). Officials may remove participants from the Match or Tournament for infractions or violations of the Code of Conduct.

4.8 Penalty Shot

For a violation of any of the above rules, a Penalty Shot may be granted by the Referee. Penalty Shots will be announced during gameplay but conducted at the end of each Set.

- Penalties for each side cancel out - only remaining penalty shots will be conducted. For example, if the Red team has 3 penalties, and the Blue team has 2, the penalties will offset and the Red team will be left with only one penalty ($3 - 2 = 1$).
- Ten seconds of extra time will be allotted per Penalty.
- The awarded Striker will attack against a single defender, selected by the defending Captains.
- In a penalty shot situation, a Pilot may change their battery if they have one currently at the referee table. Otherwise, they must fly with the battery currently attached.
- The Striker may attempt multiple goals during extra time by retreating back across the center line.
- Offsides still applies to penalty shots, the Striker must return to his or her side in order to score multiple goals.

4.9 Upside Down or Stuck Drone

Drones who are stuck upside down may utilize “turtle mode” or “flip over after crash” to right itself, or have a teammate’s drone bump the drone upright. If a drone is stuck on a part of the arena (i.e., in the netting or under the mat), the Team Captain may notify the referee who will evaluate the situation and potentially free it. Players are not allowed to touch the drones.

4.10 Disabled Non-Striker Drones

A drone that cannot continue flight must be immediately disarmed and their team will continue gameplay shorthanded for the remainder of the Set.

If a battery is dangling below a drone in flight, that drone must be immediately disarmed and their team will continue gameplay shorthanded.

4.11 Disabled Striker

During gameplay, if a Striker becomes unable to fly (Disabled Striker), the Team Captain will call out to the Head Referee “Striker down” to notify the Referee, who then stops play.

- At stop of play, all drones will land.
- The referee will unplug the Disabled Striker and remove it from the arena.
- A different active pilot will be appointed Striker and his/her drone will be placed in the start area of their Start Zone.
- Flags will be adjusted on the new Striker, which will be placed in the Start Zone and serve as Striker.
- Play will resume with remaining drones from current positions on the referees command.
- Swapping Strikers may only occur once per Set for each Team.

5. GAMEPLAY

5.1 Referee Commands and Stoppages

A timer will count down from three minutes per Set, and pause during stoppages.

- The game only stops for a referee whistle or game horn. Verbal commands from the referees or scorekeepers are for individuals and do not stop gameplay, although the referee may command a particular pilot to “DISARM”.
- Referees may stop play at any time for safety, or for a Disabled Striker when a timeout is called by the Team Captain. Penalties will not stop gameplay, and will be addressed at the end of Set.
- Pilots will remain disarmed at all times until commanded to “ARM YOUR DRONES” by the referee.

5.2 Prior to Each Set

- Captains will check in with referees and/or scorekeepers to verify pilots participating in the Set.
- Teams will clearly designate a Striker before each Set using flags. Flags will be provided by the event hosts.
- Each drone should have a charged battery securely attached to the drone, with the power cable disconnected.
- Teams will monitor start time and ensure all drones are placed on the team’s designated table prior to Set start. Teams may place additional spare drone balls (with battery and radio).
- Teams who do not have drones ready at Set start time will compete shorthanded or otherwise forfeit that Set.

5.3 Set Start

Referees (R) will place all drones into the respective Start Zone, oriented in the correct direction. Obey referee commands to verify arming, only two attempts will be made to establish a drone connection before a spare will be utilized (if available).

⚠ WARNING:

Do not attempt to arm while the aircraft is being handled.
Failure to follow these procedures may result in injury.

1. PLACE DRONE IN START ZONE (R).....COMPLETE
2. ON COMMAND (R).....“RADIOS ON”
3. RADIO POWER (P)..... ON
4. BATTERY CABLE (R)..... CONNECT
5. FLIGHT AREA.....CLEAR
6. ON COMMAND (R).....“ARM YOUR DRONES”
7. THROTTLE (P).....IDLE
8. RADIO ARMING SWITCH (P).....ON
 - Verify propellers are spinning at idle power
9. ON LIFTOFF, FLIGHT TIMER (3 MIN)..... START

5.4 “Turtle Mode” or Flip Over After Crash

During gameplay, pilots must be able to recover their own drone.

To activate Turtle Mode and recover:

1. THROTTLE.....IDLE
2. RADIO ARMING SWITCH.....DISARM
3. TURTLE MODE SWITCH.....PRESS & HOLD
4. RIGHT STICK.....FULL FORWARD
 - Wait for drone to settle in an upright position
5. RADIO ARMING SWITCH.....DISARM, AR

⚠ WARNING:

Do not connect power to a drone outside of a netted flying area.

⚠ WARNING:

Battery charging is conducted by event officials. Do not charge batteries outside of designated charging area.

Note:

A positive attitude, respect, and fair play are expected at all times.

If you have questions or need more information, please contact

info@USDroneSoccer.org or Guy@USDroneSoccer.org