FAST TRACK

MISSION 2027

COMPETITION MANUAL

Game Manual Version 1.0

RECF DRONE COMPETITIONS

RECF Aerial Drone Competition Mission 2027: Fast Track

2026-2027

Game Manual Version 1.0

August 11, 2026

Copyright 2026, Robotics Education & Competition Foundation

Prefix

Welcome and Thank You

Welcome to the Robotics Education & Competition Foundation (RECF) Aerial Drone Competition!

In the Aerial Drone Competition (ADC), students explore strategy, collaboration, coding, and piloting in a fun environment designed to inspire the next generation of problem-solvers and leaders.

ADC gets students excited about STEM through hands-on learning, documentation, and competition. Students are at the center of everything we do, and they are encouraged to take ownership of their ideas while working collaboratively with teammates and solving real world problems.

One of our goals with ADC is to allow for broader STEM access for all students. As a part of that goal, ADC field elements are designed for reuse across competition seasons. All of the ADC-legal drones are affordably-priced for education, and can be safely piloted indoors with simple safety procedures.

We are grateful that you have chosen the RECF as your competition program provider. With so many opportunities available, we are honored that you selected our program to support your students' learning and growth.

Thank you for joining our community. We cannot wait to see what your teams achieve this season!

About the RECF

The Robotics Education & Competition Foundation is a registered US 501(c)(3) non-profit organization that exists to spark interest in science, technology, engineering and math by engaging students in hands-on, sustainable, and affordable curriculum-based robotics programs.

Our global mission is to provide every educator with competition, education, and workforce readiness programs to increase student engagement in science, technology, engineering, math, and computer science. We see a future where every student designs and innovates as part of a team, overcomes failure, perseveres, and emerges confident in their ability to meet global challenges.

As a company, we embrace the core values of passion, integrity, and excellence, which we try to embody in everything we do.

Copyright 2026, Robotics Education & Competition Foundation

Revision History

RECF will release updated game manuals through the season, as listed below. Each event or league session must use the latest rule set published before the start of the event. Answers in the official Q&A system are effective immediately unless stated otherwise in the answer.

- August 11, 2026 - Initial v1.0 release
- September 29, 2026 - Possible release with minor updates
- November 10, 2026 - Possible release with minor updates
- December 22, 2026 - Major v2.0 release that may include changes to gameplay
- February 2, 2026 - Possible release with minor updates
- March 16, 2026 - Major v3.0 release with changes for regional and world championship events

Version 1.0 - August 11, 2026

- Initial release

Copyright 2026, Robotics Education & Competition Foundation

Table of Contents

Prefix **3**
Welcome and Thank You 3
About the RECF 3
Revision History 4
Table of Contents 5
Section 1: The RECF Aerial Drone Competition **9**
1.1 About the RECF Aerial Drone Competition 9
1.2 ADC Mission 2027: Fast Track 9
1.3 Four ADC Competition Missions 9
1.4 RECF Program Rules 11
1.4.1 RECF Policies 11
1.4.2 ADC Teams & Students 11
1.4.3 Supervision & Release Forms 11
1.5 Definitions 12
1.5.1 General Definitions 12
1.5.2 Fast Track Field Element Definitions 13
1.5.3 Fast Track Game Element Definitions 15
1.6 Fouls & Foul Cards 18
1.6.1 Official Warning 18
1.6.2 Yellow Card 18
1.6.3 Red Card 18
1.6.4 Fouls affect eligibility for elimination matches 18
Section 2: Drone Rules **19**
2.1 Required components 19
2.1.1 Drone models & firmware 19
2.1.2 No modifications to drones or electronics 19
2.1.2 Batteries must be charged before launch 19
2.2 Optional components 19
2.2.1 Battery packs 19
2.2.2 Decorations 19
2.3 Drone Code 19
2.3.1 Students create their own code 19
2.3.2 Coding libraries are okay as starting points 20
2.4 Drone Safety 20
2.4.1 A pre-flight checklist is required before each match 20
2.4.2 Fly only in designated flight zones 20
2.4.3 Wear eye protection 20
2.4.4 Stay in control of your drone 20
2.4.5 If a drone is grounded, it must land immediately 20

Copyright 2026, Robotics Education & Competition Foundation

2.4.6 Additional safety practices 21
Section 3: Fast Track Solo Piloting Mission 22
3.1 Scoring and scoring criteria 22
3.1.1 Matches are scored in real time 23
3.1.2 Take off 23
3.1.3 Flying under an arch gate 23
3.1.4 Flying through a keyhole gate 24
3.1.5 Flying through the tunnel 24
3.1.6 Flying through the large cube 25
3.1.7 Completing a loop around a keyhole gate 25
3.1.8 Phase 1 tasks 25
3.1.9 Phase 2 tasks 26
3.1.10 Phase 3 tasks 27
3.1.11 Phase 4 tasks 27
3.1.12 General landing criteria 27
3.1.13 Criteria for landing on the landing pad 28
3.1.14 Criteria for landing on the bullseye 28
3.1.15 Criteria for landing on a cube 28
3.2 Starting Positions 29
3.2.1 Flight team member positions and roles 29
3.2.1.1 Pilots and pilot station 29
3.2.1.2 Visual observer 29
3.2.2 Drone starting position 30
3.3 Match Play 31
3.3.1 The pilots must manually operate the drone 31
3.3.3 Missed or skipped steps during a phase 31
3.3.4 Repeating the flight path 31
3.3.5 Landing 32
3.3.6 Re-takeoff during a match 32
3.4 What Happens When Things Go Wrong 32
3.4.1 Pre-takeoff troubleshooting 32
3.4.2 Match replay 32
3.4.3 Safety issue 32
3.4.4 Appealing a decision 32
Section 4: Fast Track Solo Autonomous Flight Mission 33
4.1 Changes From the Solo Piloting Mission 33
4.1.1 Visual observer in solo autonomous flight matches 33
4.1.2 Limited human interaction 33
4.1.3 The drone can be reset as a strategy 33
4.1.3.1 Actions permitted during a reset 34
4.1.3.2 Completing a reset 34

Copyright 2026, Robotics Education & Competition Foundation

4.2 Solo Autonomous Flight Mission Scoring & Additional Scoring Criteria 34
4.2.1 Tasks can be repeated 35
4.2.2 Spiral bonus criteria 35
Section 5: Fast Track Alliance/Teamwork Mission 36
5.1 Alliance Match Scoring & Scoring Criteria 36
5.1.1 Ball in a goal 36
5.1.2 Goal bonus 37
5.1.3 Ball in a scoring zone 38
5.1.4 Bean bag cleared 38
5.1.5 Flight path completed 39
5.1.6 Landing on a cube 40
5.2 Starting Positions 40
5.2.1 Flight team member positions and roles 40
5.2.1.1 Pilots and pilot station 41
5.2.1.2 Visual observer 41
5.2.2 Drone starting positions 41
5.3 Match Play 41
5.3.1 The drone can only operate while the match timer is counting down 41
5.3.2 The drone must clearly display its assigned color during the match 41
5.3.3 Balls that leave the track aren't returned 41
5.3.4 Team-loaded balls 41
5.3.4.1 Ball movement after loading 42
5.3.5 Field element supports and tension wires 42
5.4 What Happens When Things Go Wrong 42
5.4.1 Missed match or late to a match 42
5.4.2 At the field, but not ready to play 42
Section 6: Communications Mission 43
6.1 Competition Notebook 43
6.2 Team Interviews 43
6.3 Award Deliberation 43
Section 7: Event Personnel, Processes, & Guidelines 44
7.1 Event Personnel 44
7.1.1 Event Partner 44
7.1.2 Head Referee 44
7.1.3 Scorekeeper Referee 44
7.1.4 Judge Advisor 44
7.1.5 Judge 44
7.1.6 Inspector 45
7.1.7 Field Resetter 45
7.1.8 Queuer 45
7.1.9 Emcee 45

Copyright 2026, Robotics Education & Competition Foundation

7.2 Event Processes 45
7.2.1 Team Check In 45
7.2.2 Inspection 45
7.2.3 Creating the Alliance Match Schedule 46
7.2.4 Queueing 46
7.2.5 Running Matches 46
7.2.6 Alliance Selection / Elimination Matches 46
7.2.7 Entering Award Winners 46
7.2.8 Finalizing an Event 46
7.3 Field Parameters 47
7.3.1 Equipment 47
7.3.2 Variances 47
7.4 Match Parameters 47
7.4.1 Solo Matches 47
7.4.2 Alliance Matches 47
7.4.3 Practice Matches 48
7.4.4 Alliance Selection 48
7.4.5 Elimination Matches 48
7.4.6 League Events 50

Copyright 2026, Robotics Education & Competition Foundation

Section 1: The RECF Aerial Drone Competition

1.1 About the RECF Aerial Drone Competition

The Robotics Education & Competition Foundation's (RECF) Aerial Drone Competition (ADC) provides a hands-on STEM experience focused on drone piloting, programming, and problem-solving. The program emphasizes teamwork, critical thinking, communication, and real-world application of flight concepts.

ADC teams consist of students up to 19 years old, categorized as elementary school, middle school, or high school teams (see section 1.4.2 for more details). Student team members make all of the decisions about their strategy, piloting, and coding—from blank paper all the way to championship events.

The ADC season consists of local qualifying events, which qualify teams for assigned event region championships. Teams can also qualify for the optional RECF World Championship. For more information on the qualification structure, refer to the ADC Qualifying Criteria.

1.2 ADC Mission 2027: Fast Track

In Fast Track, drones navigate teamwork fields to move balls into goals, complete flight paths, and land in specific locations before time runs out. They also participate in solo matches, where their speed and accuracy in piloting and coding are put to the ultimate test.

In some missions, team members pilot the drone. In others, the drone operates in autonomous flight mode based on pre-programmed code written by the students. Not every team will play the game the same way, and some ways to score are easier than others. Your strategies may change over time. As long as you follow the rules in this game manual and the official RECF Q&A system at games.recf.org, you can play the game however you like!

1.3 Four ADC Competition Missions

- Solo Piloting Mission (see section 3) - Team members manually pilot a drone through an obstacle course. Matches are 60 seconds, with up to three attempts per team at each event.
- Solo Autonomous Flight Mission (see section 4) - Drones operate fully autonomously to complete tasks. Matches are three minutes, with up to three attempts per team at each event.
- Alliance/Teamwork Mission (see section 5) - Your team collaborates with another team at the field to score as many points as possible using both teams' drones. Matches are 90 seconds each.
- Communications Mission (see section 6) - Document and share your team's work and use of the iterative design process in a notebook throughout the season, and describe your work to judges during interviews

Copyright 2026, Robotics Education & Competition Foundation

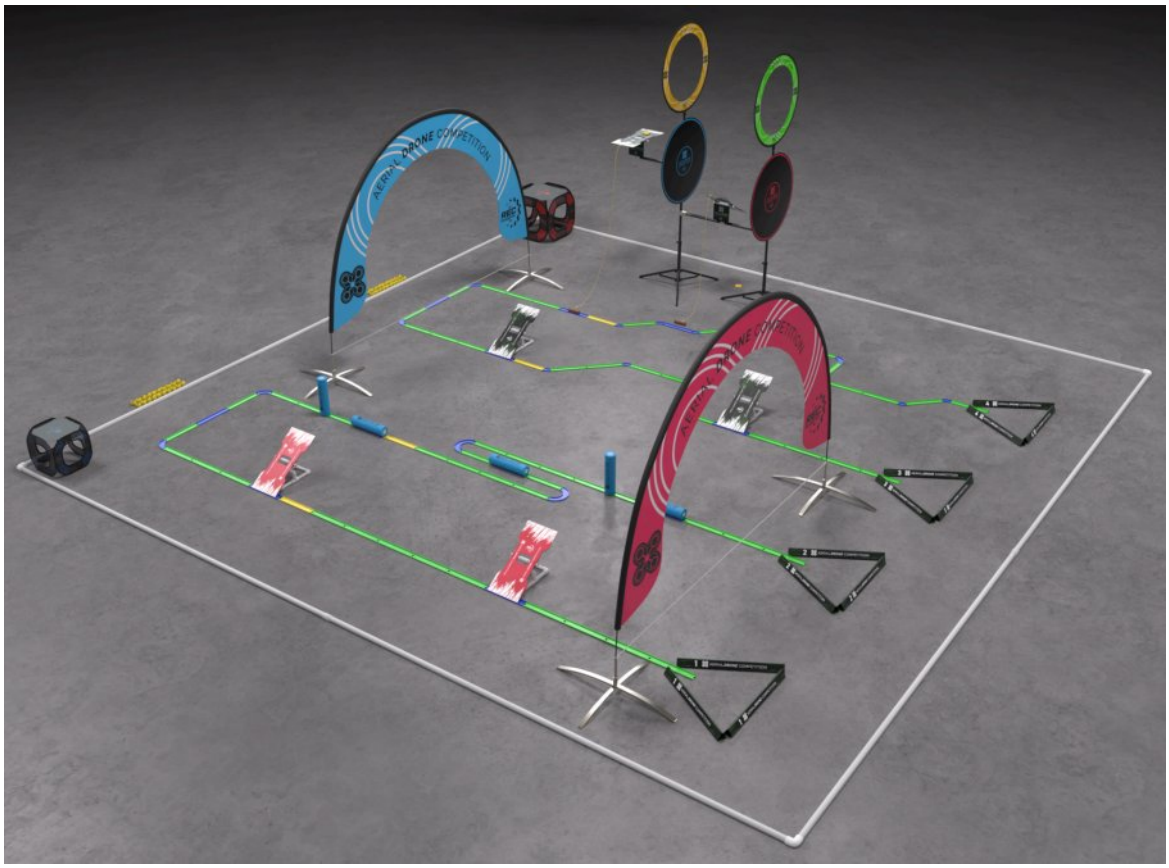


Figure 1.3.1: Fast Track alliance mission field

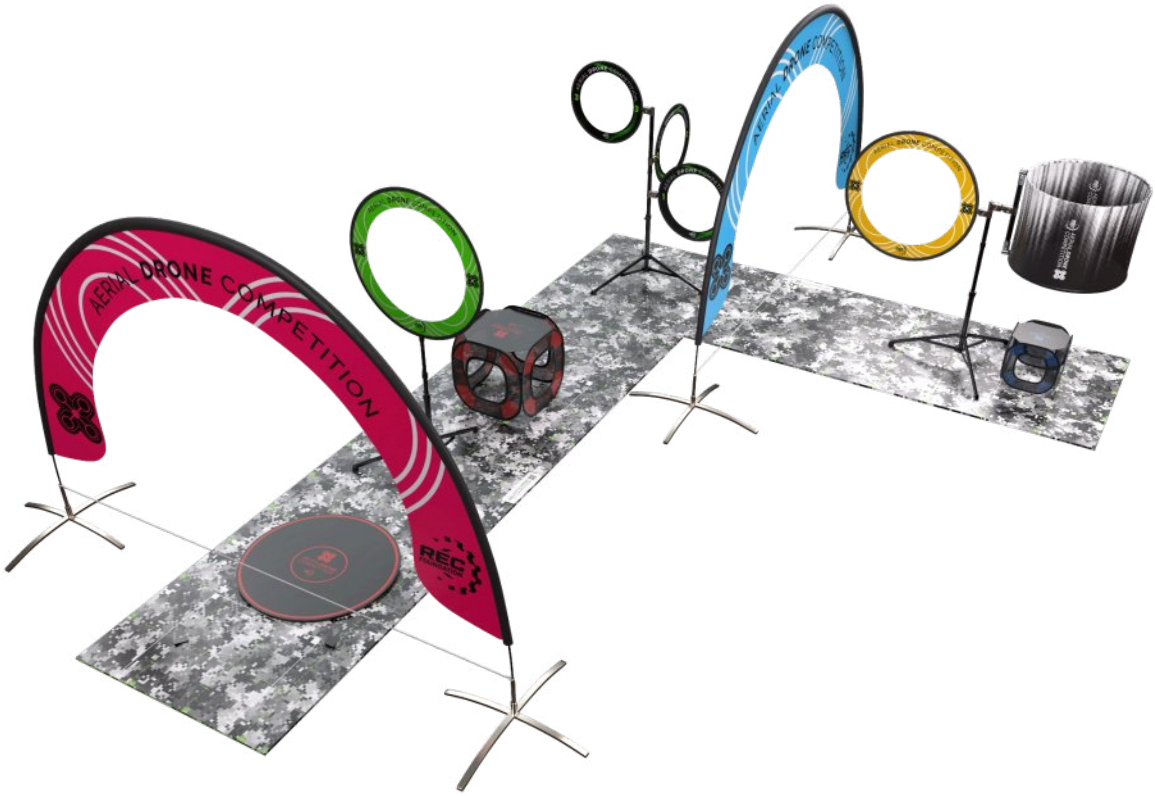


Figure 1.3.2: Fast Track solo mission field

Copyright 2026, Robotics Education & Competition Foundation

1.4 RECF Program Rules

1.4.1 RECF Policies

All participants must follow the guidelines and rules in this game manual, the official ADC Q&A at games.recf.org, and these additional official RECF policies.

- RECF Organizational Policy
- RECF Student-Centered Policy
- RECF Code of Conduct
- ADC Qualifying Criteria
- ADC Guide to Judging
- RECF Youth Protection Policy
- RECF Commitment to Coach Excellence
- RECF Commitment to Event Excellence

1.4.2 ADC Teams & Students

Teams must be registered in RECFevents.org for the RECF ADC program to participate in ADC qualifying events.

Each ADC team has one or more students. Students are categorized by their age at the end of the 2027 RECF World Championship.

- To compete in the 12U / elementary school category, a student must be 12 years of age or younger on May 6, 2027.
- To compete in the 15U / middle school category, a student must be 15 years of age or younger on May 6, 2027.
- To compete in the 19U / high school category, a student must be 19 years of age or younger on May 6, 2027, and not yet graduated from secondary school.

Team structure must follow the RECF Organizational Policy. Teams must be student-centered and follow the RECF Student-Centered Policy and the RECF Code of Conduct at all times, including at practices and when attending events.

1.4.3 Supervision & Release Forms

When attending events, students must be accompanied by a responsible adult over the age of 18 for the duration of the event. All participants in RECF events must complete an RECF Participant Release Form each season.

Copyright 2026, Robotics Education & Competition Foundation

1.5 Definitions

1.5.1 General Definitions

- **All Clear** - A signal from a head referee that teams may retrieve their drones
- **Alliance** - Two teams assigned to work cooperatively during a match to score shared points
- **Alliance Match** - A match that includes one or more cooperative alliances; sometimes referred to as a teamwork match
- **Alliance Selection** - The process used to determine which teams will participate in elimination matches (see section 7.4.4)
- **C²** - RECF Competition Control, the software used to run matches, inspection, check-in, scoring, and other functions at an RECF competition
- **Coach / Mentor** - A person who helps students learn concepts used in RECF competitions, and who helps create and organize teams, but who cannot contribute to the students' work used at competitions
- **Competition Notebook** - A physical or electronic document that records a team's iterative design process and their work during a competition season
- **Drone** - A machine designed to perform one or more tasks autonomously or by remote control from a pilot or co-pilot
- **Elimination Match** - A quarterfinal, semifinal, or finals match that includes two ranked teams paired by C², and is run to identify the tournament winners
- **Field Element** - An element on the competition field that is part of the ADC Field Element Kit, and reused across multiple competition seasons (see section 1.5.2 for details)
- **Flight Team** - 1-3 students who participate in a match as representatives for their team
    - **Pilot** - A flight team member who operates their team's drone during a match
    - **Co-pilot** - A flight team member who assists the pilot or serves as an additional pilot during a match
    - **Visual Observer** - A flight team member who communicates with the pilot/co-pilot, and who may introduce team-loaded objects during the match
- **Flight Zone** - An area where drones are allowed to fly at an event (approximately 10' height limit)
    - **Alliance Field Flight Zone** - A conceptual area that surrounds an alliance match field; event partners must clearly mark the boundaries of this flight zone using PVC, tape, rope, cones, or similar materials
    - **Solo Match Field Flight Zone** - A conceptual area defined by the outer edges of the solo match field elements
    - **Additional Flight Zones** - The event partner may designate additional flight zones to be used as practice or testing areas
- **Foul** - The act of breaking a rule during a match or event (see section 1.6 for more details)
- **Foul Card** - A tracking system for repeated rule infractions (see section 1.6 for more details)

Copyright 2026, Robotics Education & Competition Foundation

- **Game Element** - An element on the teamwork match field that is part of the ADC Game Element Kit, and typically used for a single season (see section 1.5.3 for details)
- **Grounded** - Description of a drone that has broken a safety rule and is no longer allowed to participate in the match; the drone must land immediately and is not allowed to fly for the remainder of the match, and the controller should be placed on the floor or another nearby position (not on the field)
- **No-Fly Zone** - Anywhere in or around a venue that is not a flight zone
- **Pilot Station** - A defined area, approximately 3’ deep, adjacent to the field where a flight team’s pilot and co-pilot must remain during a match
- **Solo Autonomous Flight Match** - A three-minute period with one drone and one flight team, during which the drone operates only by code created by the students; sometimes referred to as a skills match
- **Solo Piloting Match** - A one-minute match with one drone and one flight team, during which students operate the drone by remote control; sometimes referred to as a skills match
- **Student** - A team member who meets all requirements of the program, is within the age bracket (see section 1.4.2), and who contributes to a team’s notebook, code, and/or strategies, or serves as a flight team member; a student can only participate on one ADC team during a season in any role (coder, pilot, visual observer, etc.)
- **Tournament** - An official ADC event that meets the requirements of the ADC Qualifying Criteria, and includes teamwork matches, solo piloting matches, solo autonomous flight matches, and optional judging
- **Visual Observer Station** - A defined area, approximately 3’ deep, adjacent to the field where a flight team’s visual observer must remain during a match

1.5.2 Fast Track Field Element Definitions

- **Arch Gate** - A red or blue arched field element with outer dimensions of approximately 102” wide and 74” tall from the floor, inner dimensions of approximately 60” wide and 63” tall from the floor, and a tension wire that spans approximately 102” (see figure 1.5.2)
- **Cube** - A large or small pop-up, hollow field element that is approximately 17”x17” across and 20” tall (large cube) or 12”x12” across and 13” tall (small) (see figure 1.5.2)
- **Keyhole Gate** - A yellow or green circular field element with an outer diameter of approximately 30” and an inner diameter of approximately 24” (see figure 1.5.2)
- **Landing Pad** - A red or blue circular field element with an outer diameter of approximately 30” and a bullseye diameter of approximately 10” (see figure 1.5.2)
- **Programming Mat** - A flat, printed vinyl field element used in solo matches to aid in setup and provide consistent sensor readings, with dimensions of 96”x42” (see figure 1.5.2)
- **Tunnel** - A fabric, tube-shaped field element that is open at both ends, with a diameter of approximately 23.5” and a length of approximately 19” (see figure 1.5.2)

Copyright 2026, Robotics Education & Competition Foundation

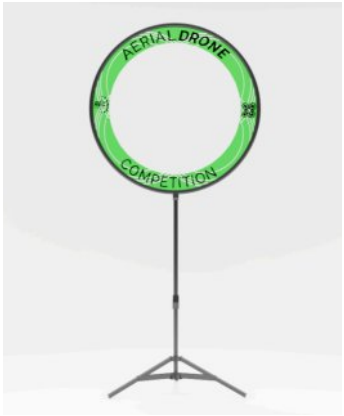
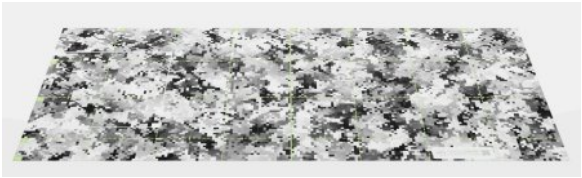
Arch Gate	**Cube**
Keyhole Gate	**Landing Pad**
	
Programming Mat	**Tunnel**
	

Figure 1.5.2: Fast Track field elements

Copyright 2026, Robotics Education & Competition Foundation

1.5.3 Fast Track Game Element Definitions

- **Ball** - A yellow, spherical game element with a diameter of 1.65” and a weight of approximately 0.12 ounces (see figure 1.5.3-F1)
- **Bean Bag** - A square, yellow, flexible, pellet-filled cloth game element that is approximately 2.5”x2.5” with a weight of approximately 0.25 ounces (see figure 1.5.3-F1)
- **Block** - A wooden, rectangular game element with an eye hook; measures approximately 3.25”x1.25” wide and 0.75” high with a weight of approximately 1.55 ounces (see figure 1.5.3-F1)
- **Goal** - A game element that consists of three folded sections of corrugated plastic, each 2’ long by 2” high (see figure 1.5.3-F1)
- **Loading Station** - A designated area where visual observers handle and prepare balls for the loading zones; each loading station begins the match with a supply of 20 balls
- **Loading Zone** - A section of track, parallel to the loading station, where visual observers can place team-loaded balls (see figure 1.5.3-F1)
- **Pillar** - A cylindrical, foam game element that is approximately 12” high with a diameter of 3” (see figure 1.5.3-F1)
- **Spiral** - A game element made of up three mini keyhole gates (see figure 1.5.3-F1)
- **Supply** - A set of balls that begin a match in a loading station, and which can be introduced to a loading zone during the match
- **Switch** - A coroplast and PVC game element that can be pivoted by a drone during a match; see the ADC Fast Track Game Element Assembly Instructions for measurements
    - **Low Switch** - A switch that rests on the ground and is in direct contact with a track at the beginning of a match (see figure 1.5.3-F1)
    - **High Switch** - An elevated switch that is tethered to a block (see figure 1.5.3-F1)
- **Track** - A game element that is constructed from segments of concave molded plastic, connected with plastic connecter clips in specific ways to route balls toward goals (see figure 1.5.3-F2)

Copyright 2026, Robotics Education & Competition Foundation

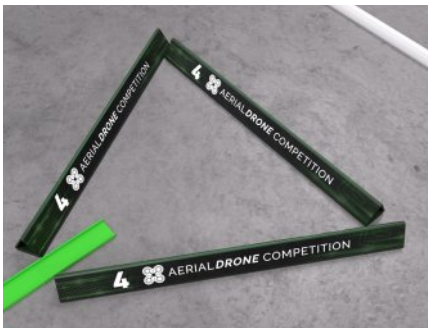
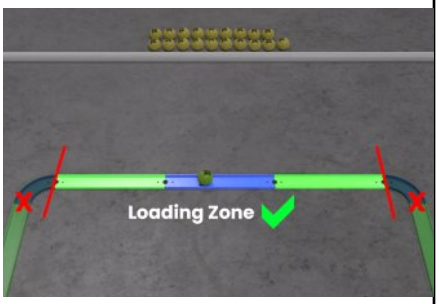
Ball	Bean Bag	Block
Goal	**Loading Zone**	**Pillar**
		
Spiral	**Low Switch**	**High Switch**

Figure 1.5.3-F1: Fast Track game elements

Copyright 2026, Robotics Education & Competition Foundation

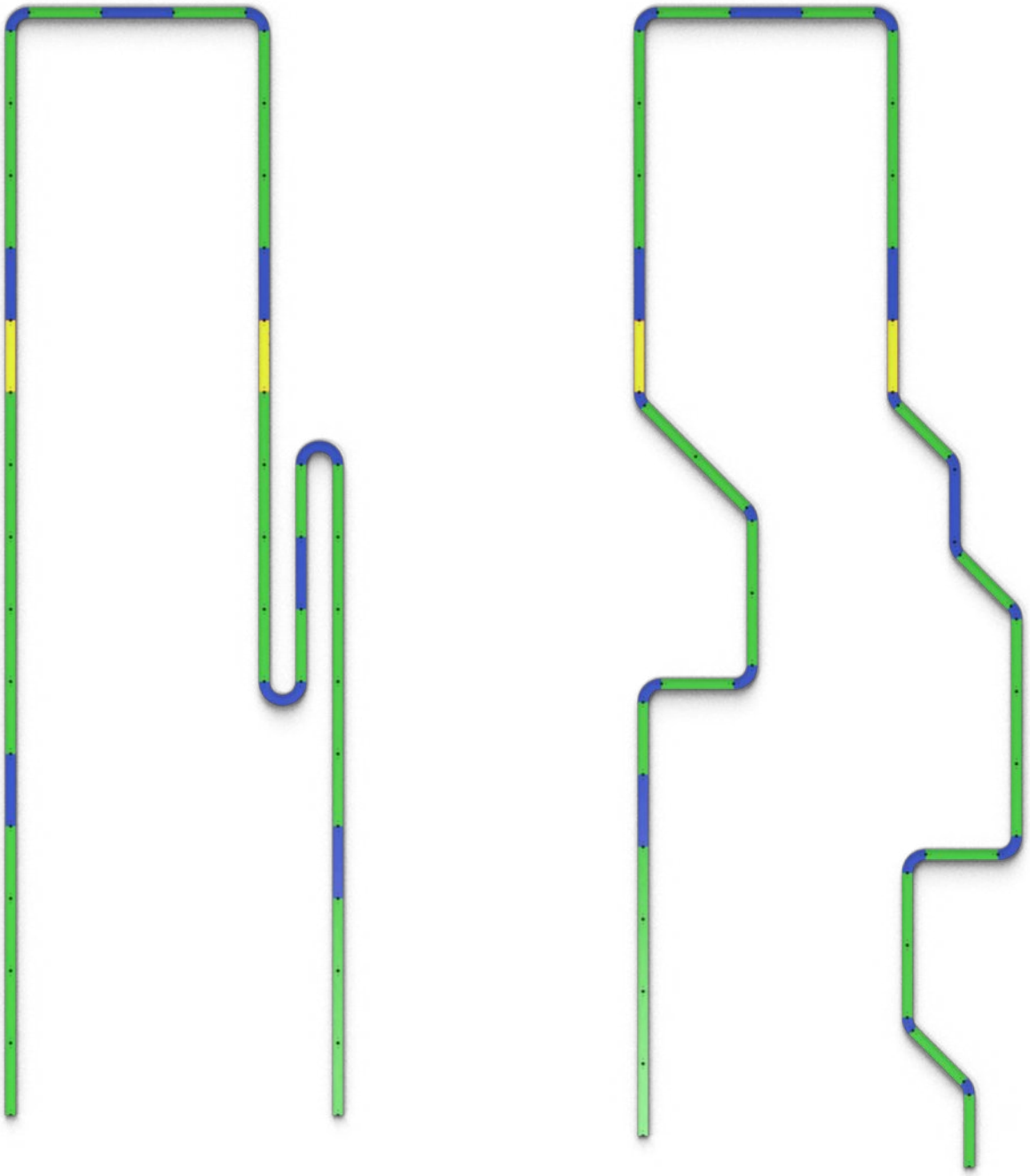


Figure 1.5.3-F2: Fast Track track layout

Copyright 2026, Robotics Education & Competition Foundation

1.6 Fouls & Foul Cards

Fouls are decided by a head referee during a match and occur when a rule of gameplay or safety is broken. Fouls may also occur when the Code of Conduct is violated during an event, as determined by the event partner or the head referee. For fouls that involve damage or potential damage to the field, people, or other drones, a head referee may also require that the drone be grounded.

Foul cards serve as a tracking system for fouls. Foul cards are announced verbally and recorded by a head referee after a match. All foul cards stay with the team for the entire tournament.

Head referees should focus on helping teams avoid fouls before they happen, by calling out actions that may lead to a foul. Advance warnings like these do not count as official warnings, and are not recorded by referees.

1.6.1 Official Warning

An official warning is given to an alliance, team, or team member verbally by the head referee the first time they break a specific rule, provided the foul does not improve the score of a match. This official warning helps students learn how to prevent future fouls before they lead to penalties. Future violations of the same rule should result in a yellow card for that rule. For example, the first time a team continues flying after the timer hits zero (without scoring points), they will receive an official warning if the violation didn't improve the match score.

1.6.2 Yellow Card

A yellow card is given to an alliance, team, or team member the second time they break a rule (after they have received an official warning for breaking that specific rule). For example, if a team continues flying after the timer hits zero (without scoring points) a second time during an event, they will receive a yellow card if the violation didn't improve the match score.

1.6.3 Red Card

A red card is given to an alliance, team, or team member the third time they break a rule (after they have received a yellow card for breaking that specific rule). For example, the third time (and any additional times) a team continues flying after the timer hits zero (without scoring points) they would earn a team a red card.

A team that receives a red card will earn zero points for the current match. In an alliance match, a team that does not receive the red card will receive the actual score of the match. In finals matches, both teams in the alliance will receive a zero score.

Any foul that improves the score of the match will receive a red card for each offense. Fouls related to the RECF Code of Conduct, the RECF Student-Centered Policy, or safety rules may also receive a red card for each offense.

1.6.4 Fouls affect eligibility for elimination matches

Any team that receives three or more red cards during an event cannot be part of an alliance for elimination matches. Eligibility for judged awards may also be affected.

Copyright 2026, Robotics Education & Competition Foundation

Section 2: Drone Rules

A team can bring as many drones to a competition as they wish, but teams must pass a brief flight clearance inspection before they can participate in matches at an official RECF event. Intentionally breaking a drone rule for improved performance may be handled as a violation of the RECF Code of Conduct. Drones that don't comply with the rules in sections 2.1 and 2.2 cannot be used in matches.

2.1 Required components

2.1.1 Drone models & firmware

All teams must use the CoDrone EDU, the CoDrone EDU JROTC Edition, and/or Parrot Mambo. CoDrone EDUs must be running the firmware approved by Robolink. The most current list of approved versions can be found at codrone.robolink.com. The Parrot Mambo does not offer firmware updates.

2.1.2 No modifications to drones or electronics

Drones and electronic components cannot be modified in any way, other than labeling and/or external decorations. Replacement motors, propellers, frames, and drone batteries must be identical official parts.

2.1.2 Batteries must be charged before launch

A drone will not be permitted to launch if it indicates a low battery level.

2.2 Optional components

2.2.1 Battery packs

Connecting an external battery pack to the drone's controller is allowed.

2.2.2 Decorations

Decorations are permitted if they don't break other rules, don't create safety hazards, don't interfere with the drone's ability to sustain flight, and reflect the spirit of an educational competition.

2.3 Drone Code

2.3.1 Students create their own code

A team's student members get to decide what their drone's code looks like, and what it does. Adults may teach coding concepts, but may not tell students what should or should not be included in their code. Students have many choices in the tools and languages they use to code their drones, including laptops, tablets, and the TI-Nspire calculator.

Copyright 2026, Robotics Education & Competition Foundation

2.3.2 Coding libraries are okay as starting points

Teams can use coding libraries as a starting point, but should modify the resulting code to make it their own. They should be able to explain how their code works and how it has been modified from the original ideas when asked. Outside references should be appropriately credited and described in teams' engineering notebooks.

2.4 Drone Safety

2.4.1 A pre-flight checklist is required before each match

Flight teams must use a pre-flight checklist to self-inspect their drone and controller before each match.

2.4.2 Fly only in designated flight zones

Drones may only be operated within designated flight zones and must comply with all posted event rules. All other areas (e.g., hallways, pits, parking lots) are no-fly zones at all times. Unsafe, reckless, or intentional actions can result in an immediate red card or removal from the event without warning.

2.4.3 Wear eye protection

Team members must wear eye protection in and around all flight zones. We highly recommend safety glasses with non-shattering lenses and side shields for maximum safety. Students cannot participate as flight team members without eye protection, and will be asked to leave the field.

2.4.4 Stay in control of your drone

If a referee believes there is an immediate safety issue (e.g., a pilot isn't in control of the drone or it's too close to the audience), they'll indicate that the drone should be grounded.

Examples

- ✅Safe: The drone briefly moves outside of the flight zone, but the pilot quickly returns the drone to the flight zone and remains in control of the drone at all times.
- ✅Safe: The pilot is maneuvering the drone near the loading zone and is in control of the drone at all times.
- 🚫Unsafe: The drone is 5 feet away from the flight zone and the pilot is struggling to return to the flight zone.
- 🚫Unsafe: The pilot is flying close to a referee or visual observer's face.

2.4.5 If a drone is grounded, it must land immediately

If a head referee indicates that a drone should be grounded during a match, the team must land the drone immediately and place their controller on the floor or other surface. The drone must remain grounded for the remainder of that match.

Copyright 2026, Robotics Education & Competition Foundation

2.4.6 Additional safety practices

While a coach or flight team member may choose to implement additional safety practices for their own team, an event partner is not allowed to add/enforce additional safety rules or practices at the match fields that are not required in this game manual.

Additional safety practices that a coach or flight team member have as part of their team safety plan are allowed, as long as they don't conflict with the rules in this game manual.

Examples of optional safety practices at teams' discretion:

- Tie hair back.
- Remove loose jewelry.
- Wear a hard hat or safety vest.
- Wear closed-toe shoes.

Copyright 2026, Robotics Education & Competition Foundation

Section 3: Fast Track Solo Piloting Mission

In the Fast Track solo piloting mission, student flight teams have 60 seconds to score as many points as possible while operating their drone with a remote controller. Solo matches aren't pre-scheduled, and each team will have up to three attempts per competition. The field setup is shown in figure 3.0.1. Solo piloting matches help teams master the basics of drone flight and control. Once students understand the rules for the solo piloting mission, they're ready to apply their piloting skills and course knowledge to other match types.

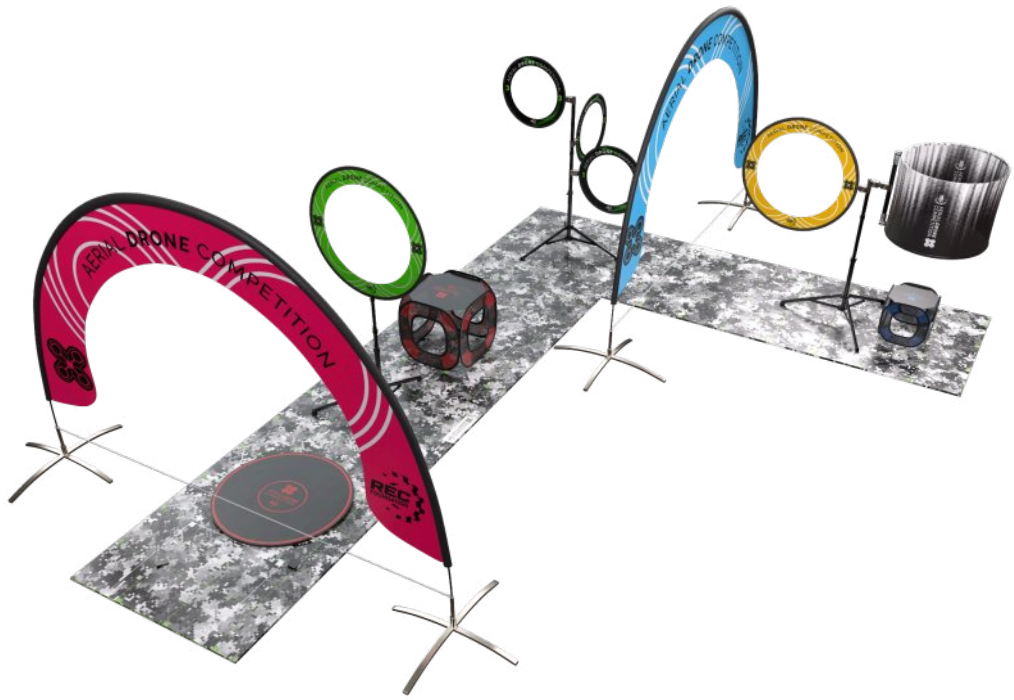


Figure 3.0.1: Solo mission field layout

3.1 Scoring and scoring criteria

Scoring Task	Points	Max per Match
Take off	5 points	Once
Phase 1	5 points	Unlimited
Phase 2	10 points	Unlimited
Phase 3	15 points	Unlimited
Phase 4	10 points	Unlimited
Landing	5 points on a landing pad 10 points on any cube 15 points on a bullseye	Once, regardless of landing location

Copyright 2026, Robotics Education & Competition Foundation

3.1.1 Matches are scored in real time

The referee will actively score during the match. It is recommended that the referee verbally confirm each task as it is successfully completed (e.g., “through the keyhole” or “under the arch”). To assist with accurate scoring, a flight team member may stand near the referee to help confirm tasks as they occur.

3.1.1.1 All scoring ends when the match timer reaches 0.

3.1.1.2 Points scored after the timer reaches 0 will be deducted before the score is submitted.

3.1.1.3 In cases where the drone’s position is uncertain or requires a judgment call, the head referees should give teams the higher point value of the two options. Head referees are not expected or required to check imperceptibly small measurements.

3.1.2 Take off

A drone has completed take off once it has lifted entirely off the ground after the match timer starts.

3.1.3 Flying under an arch gate

A drone is considered to have flown under an arch gate when it has passed under the arch in the direction shown in figure 3.1.3, and no part of the drone remains below the arch gate.

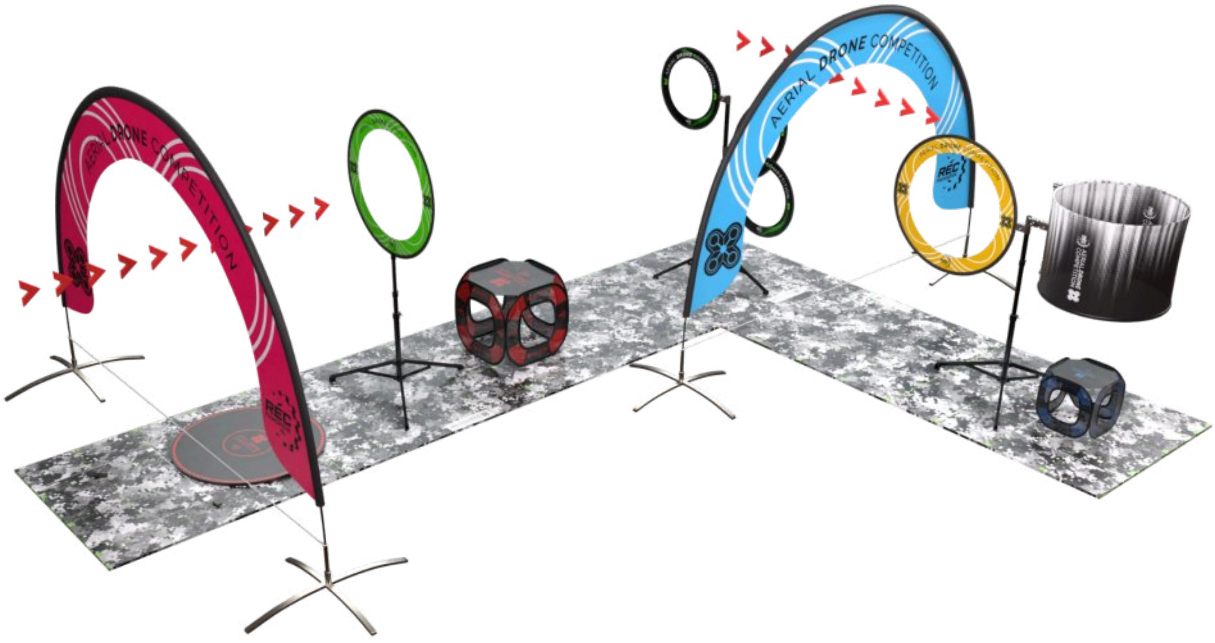


Figure 3.1.3: Flying under an arch gate

Copyright 2026, Robotics Education & Competition Foundation

3.1.4 Flying through a keyhole gate

A drone is considered to have flown through a keyhole gate when it has passed through the keyhole in the direction shown in figure 3.1.4 and no part of the drone remains within the keyhole gate.

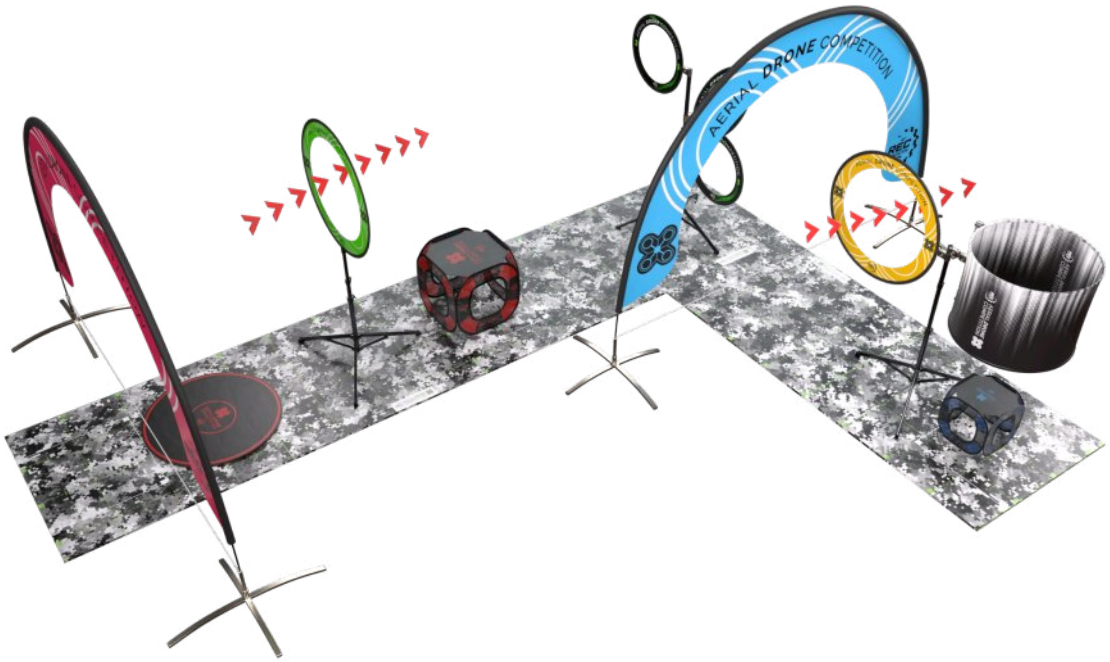


Figure 3.1.4: Flying through a keyhole or mini-keyhole gate

3.1.5 Flying through the tunnel

A drone is considered to have flown through the tunnel when it has passed through the tunnel in the direction shown in figure 3.1.5 and no part of the drone remains within the tunnel.

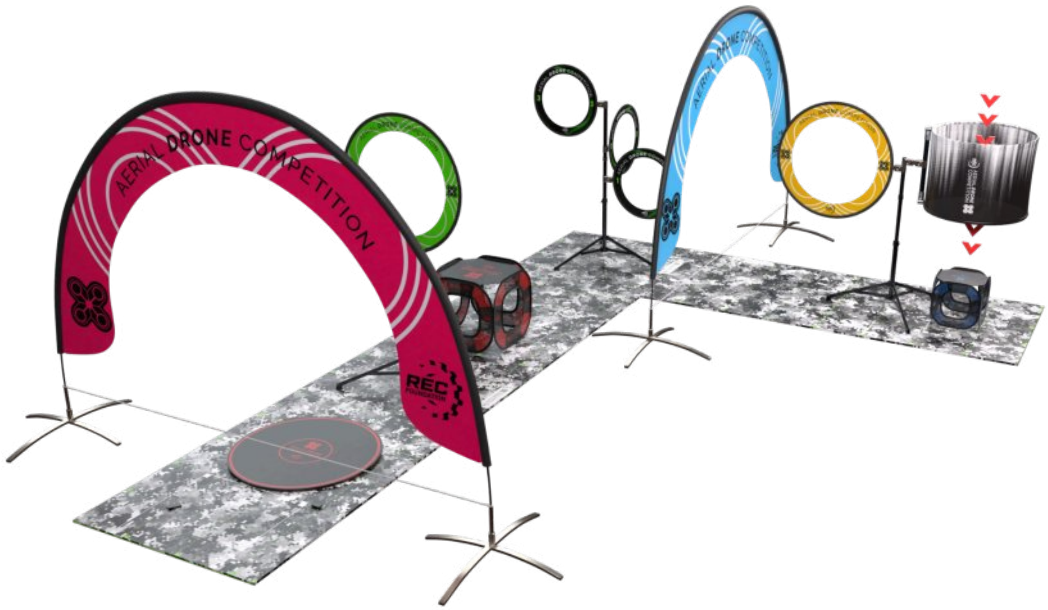


Figure 3.1.5: Flying through the tunnel

Copyright 2026, Robotics Education & Competition Foundation

3.1.6 Flying through the large cube

A drone is considered to have flown through a large cube when all parts of the drone have entered through one side of the cube and the drone exits the cube through one of the other three sides (see figure 3.1.6).

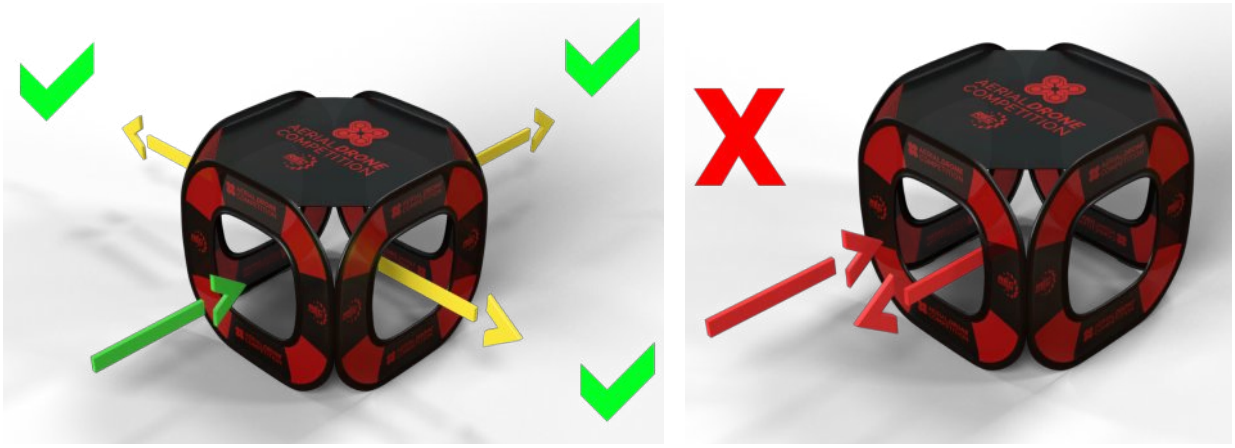


Figure 3.1.6: Flying through a large cube

3.1.7 Completing a loop around a keyhole gate

To complete a loop around a keyhole gate (see figure 3.1.10), the drone must fly over the top of the gate between the 10 o'clock position and the 2 o'clock position of the gate. Teams are expected to fly as close as possible to the 12 o'clock position (top-center) of the gate.

Teams are strongly encouraged to make it clearly visible that the drone has flown over the top of the gate during the loop. Teams that fly off the center line are more subject to the referee's interpretation and angle of vision.

3.1.8 Phase 1 tasks

Phase 1 is considered complete when the following tasks are completed in order and in the direction indicated in figure 3.1.8.

1. Fly under the red arch gate.
2. Fly through the green keyhole gate.
3. Fly through the large cube.

Copyright 2026, Robotics Education & Competition Foundation

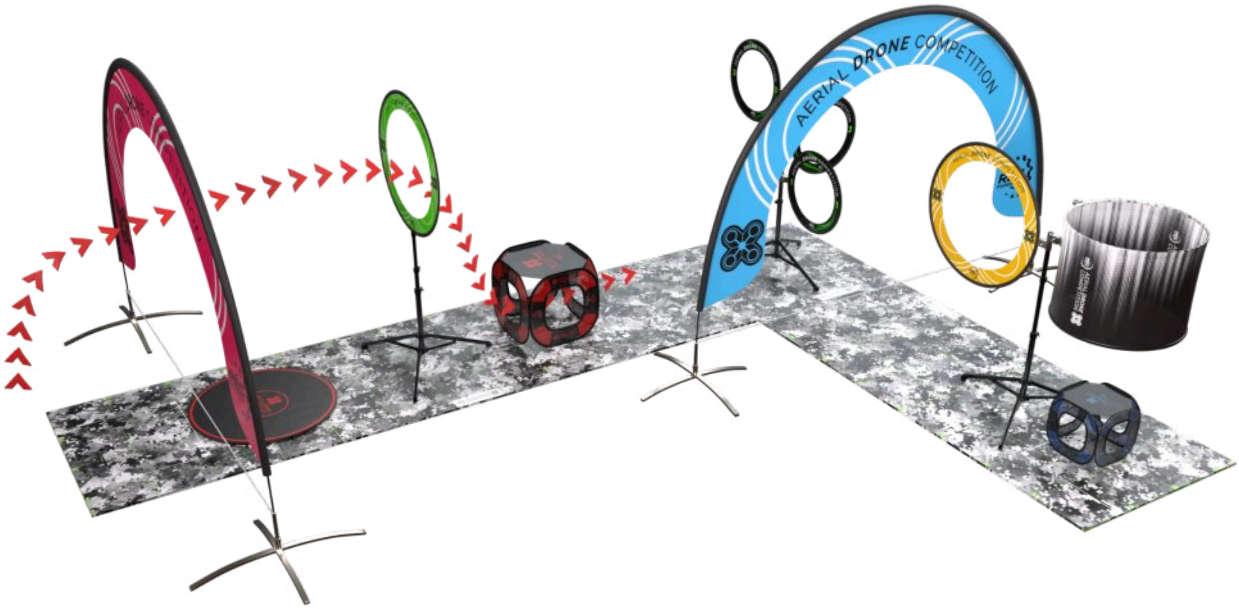


Figure 3.1.8: Phase 1 tasks

3.1.9 Phase 2 tasks

Phase 2 is considered complete when the following tasks are completed in order and in the direction indicated in figure 3.1.9.

1. Fly through mini keyhole gate 1 (lowest of the three).
2. Fly through mini keyhole gate 2 (middle of the three).
3. Fly through mini keyhole gate 3 (highest of the three).

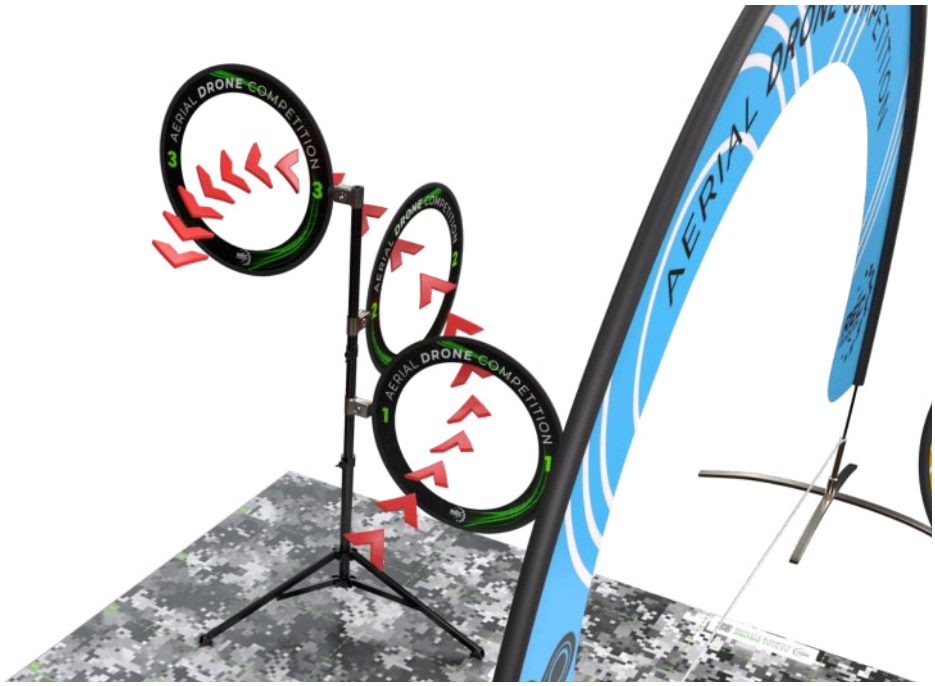


Figure 3.1.9: Phase 2 & phase 4 tasks

Copyright 2026, Robotics Education & Competition Foundation

3.1.10 Phase 3 tasks

Phase 3 is considered complete when the following tasks are completed in order and in the direction indicated in figure 3.1.10.

1. Fly under the blue arch gate.
2. Complete a loop around the yellow keyhole gate.
3. Fly through the tunnel from top to bottom.
4. Fly under the blue arch gate again.

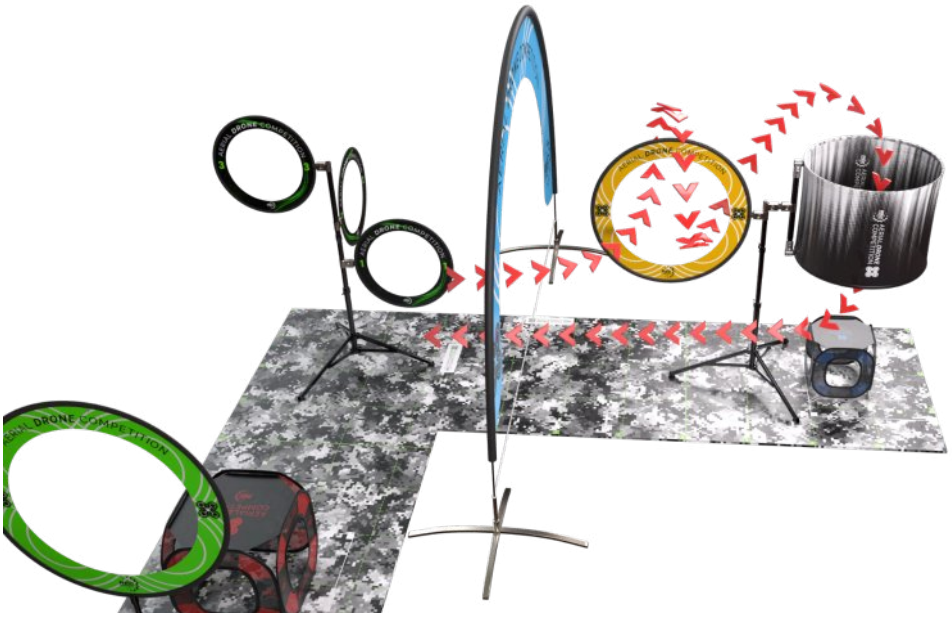


Figure 3.1.10: Phase 3 tasks

3.1.11 Phase 4 tasks

Phase 4 is considered complete when the following tasks are completed in order and in the direction indicated in figure 3.1.9.

1. Fly through mini keyhole gate 1 (lowest of the three).
2. Fly through mini keyhole gate 2 (middle of the three).
3. Fly through mini keyhole gate 3 (highest of the three).

3.1.12 General landing criteria

A drone is considered landed if it meets these criteria at the end of the match.

- The drone has landed before the match timer reaches zero.
- The drone is not touching the floor.
- The drone does not take off again.
- The drone is not upside down.

Copyright 2026, Robotics Education & Competition Foundation

3.1.13 Criteria for landing on the landing pad

A drone is considered landed on the landing pad if it meets all criteria for 3.1.12 and 3.1.13.

- The drone is touching the landing pad.
- The drone is not touching any field element or game element.

3.1.14 Criteria for landing on the bullseye

A drone is considered landed on the bullseye if it meets all criteria for 3.1.12 and 3.1.14.

- The drone is in the center ring of the landing pad.
- The drone is not contacting any portion of the landing pad beyond the line of the center ring. The line of the ring is considered part of the bullseye.

Figure 3.1.14: Two examples of drones landed on the bullseye; drone landed outside of the bullseye

3.1.15 Criteria for landing on a cube

A drone is considered landed on a cube if it meets all criteria for 3.1.12 and any part of the drone is touching the flat surface on the top of the cube (see figure 3.1.15).

Copyright 2026, Robotics Education & Competition Foundation

Figure 3.1.15: Three examples of drones landed on a cube (the drone is contacting the top of the cube in all three examples); upside-down drone that does not count as landed

3.2 Starting Positions

3.2.1 Flight team member positions and roles

Up to three student team members (the flight team) can come to the field for each solo piloting match.

Flight team members can't wear headphones or communicate with anyone beyond the field during the match, and spectators or non-flight team students can't coach the flight team or approach the field.

Sitting or standing on chairs/stools for support or elevation is only allowed if approved by the RECF through an accommodation request.

Entering the field is not allowed unless permitted by specific rules.

3.2.1.1 Pilots and pilot station

The pilot and co-pilot must remain within the pilot station, as shown in figure 3.2.2, unless briefly stepping out for safety. They may move freely within the boundaries of this station to operate equipment, communicate, and collaborate. Only the pilot and/or co-pilot can operate the drone during the match.

3.2.1.2 Visual observer

The visual observer may move freely along the outer perimeter of the field to communicate with the pilot and co-pilot, observe drone performance, and catch the drone in case of an emergency stop.

Copyright 2026, Robotics Education & Competition Foundation

3.2.2 Drone starting position

Only one drone may be used on the field per match. The drone must begin the match in contact with the first foot of the programming mat, as shown in figure 3.2.2. The drone's propellers may be in motion before the match begins, but the drone must remain on the ground until the match begins.

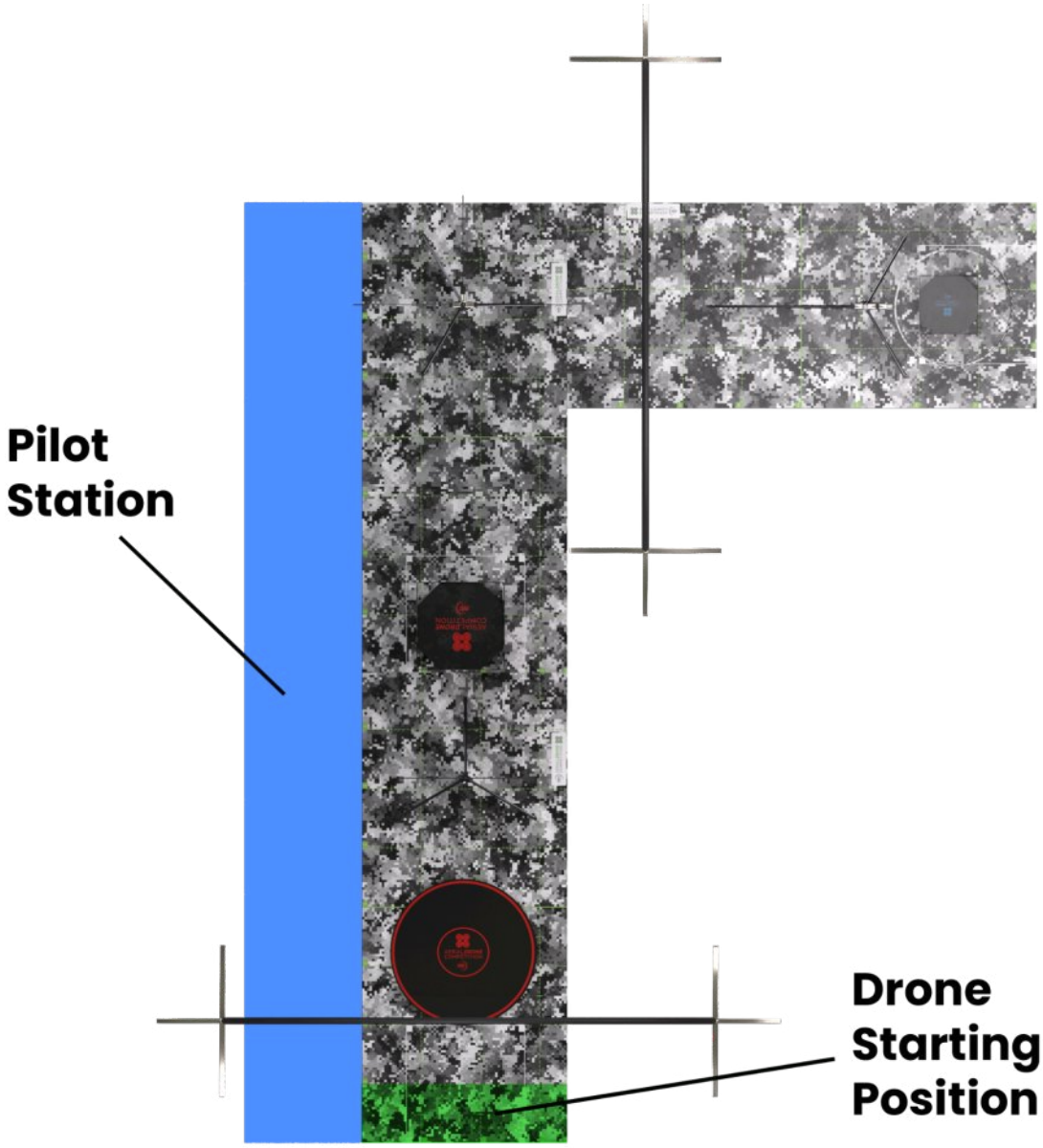


Figure 3.2.2: Solo match stations and starting positions

Copyright 2026, Robotics Education & Competition Foundation

3.3 Match Play

3.3.1 The pilots must manually operate the drone

During solo piloting matches, the drone is fully controlled by the pilot and/or co-pilot using the controller, allowing teams to demonstrate their hands-on flying skills and showcase precision, skill, and real-time decision-making in controlling the drone.

All flight operations must be performed manually, without any code-assisted or computer-mediated control. The controller cannot be connected to a computer during the match.

3.3.2 Flight path phases

The Fast Track solo flight path has four phases, each with tasks that must be completed in order and in the specified directions. Phases must be completed in order (phase 1, then phase 2, etc.). A phase is considered complete when all its tasks are finished in sequence.

3.3.3 Missed or skipped steps during a phase

If a team misses or skips any required step during a phase of the flight path, they will not receive points for that phase. The team must return to the missed step and complete the required task before continuing to earn points for subsequent phases.

3.3.4 Repeating the flight path

After completing phase 4, a team may repeat the flight path as desired while time remains in the match. To begin a repeated flight path, the drone must fly over the red arch gate (see figure 3.3.4) and begin phase 1 of the repeated flight path.

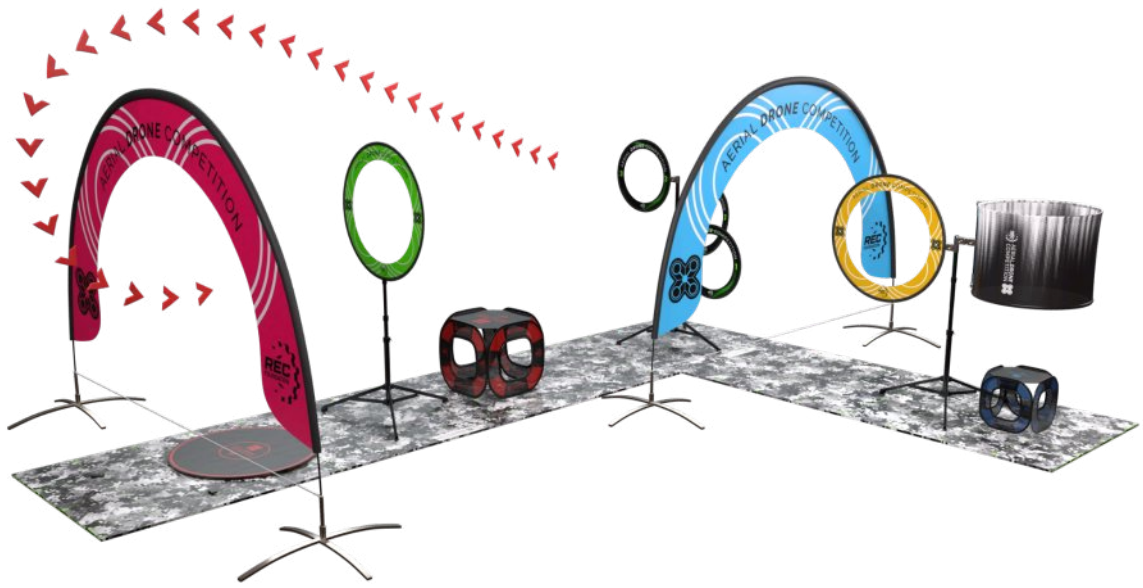


Figure 3.3.4: Repeating the Fast Track solo match flight path

Copyright 2026, Robotics Education & Competition Foundation

3.3.5 Landing

A drone may land multiple times during a match, but landing points are only awarded for its final landing at the end of the match. To earn these points, the drone must remain in place without taking off or moving after this final landing. Even if earlier landings were perfect, only the final, stationary landing counts.

3.3.6 Re-takeoff during a match

If a drone lands or crashes—whether intentionally or unintentionally—the pilot may attempt to take off again and continue the match. However, the drone cannot be touched at any time during this process.

3.4 What Happens When Things Go Wrong

3.4.1 Pre-takeoff troubleshooting

If the drone has not taken off after the match begins, flight team members may briefly enter the flight zone to retrieve and troubleshoot it (e.g., power, battery, pairing). The drone must be returned to a legal starting position before resuming. The match timer will not stop.

3.4.2 Match replay

The head referee and event partner may decide to replay a match due to technical issues outside of the team's control that affect the score.

3.4.3 Safety issue

If a drone presents a safety risk, it may be grounded by the head referee for the rest of the match. If the head referee decides that damage or injury caused by a student or drone during a match is intentional, the team may earn a red card foul and a zero score for the match.

3.4.4 Appealing a decision

If the flight team members disagree with a decision made or score recorded by a referee, they should remain at the field and notify the referee immediately. Flight team members and referees should be prepared to show specific rules and/or Q&A answers that back up their opinions, and should remember that referees can only make rulings based on the game manual and their own observations and perspectives of the match. Referees and flight team members may never view video or photos from the match while at the field or during discussions that affect match outcomes or scoring, and team members who were not at the field for the match are not allowed to approach the field. The head referee will determine when the discussion is over, and will announce their final and binding decision.

Copyright 2026, Robotics Education & Competition Foundation

Section 4: Fast Track Solo Autonomous Flight Mission

In the Fast Track solo autonomous flight mission, teams program their drones to operate completely autonomously during a 3-minute match. Each team has up to three attempts per competition. Teams can complete tasks in any order, reset their drone to the starting position as many times as needed, and modify or update their programming code during each reset. Points accumulate throughout the 3-minute match period, regardless of how many times the drone is reset, giving each team an opportunity to maximize their score.

Rules from Section 3: Solo Piloting Mission apply unless they're specifically changed by a rule in this section.

4.1 Changes From the Solo Piloting Mission

4.1.1 Visual observer in solo autonomous flight matches

The visual observer may also enter the flight zone as needed to support safe operation during a solo autonomous flight match, including retrieving or resetting the drone and positioning to catch the drone when necessary.

Hand catching the drone is permitted for both safety intervention and operational reset. All catches are considered valid provided they are performed safely and do not violate any other rules.

If a team has only one flight team member present, that member may also serve as the visual observer in a solo autonomous flight match.

4.1.2 Limited human interaction

During solo autonomous flight matches, the drone must operate entirely based on pre-programmed instructions. Flight teams are prohibited from interacting with the controller to directly control the drone during solo autonomous flight matches. However, this rule does not restrict actions that maintain connectivity. Repositioning the controller or adjusting the antenna during the match to ensure reliable communication with the drone is permitted, as long as no direct control of the drone is attempted.

Team members may start the program using their coding device, but cannot interact with the drone, controllers, or coding device in any other way, except to reset the drone, end the program early, and/or to perform an emergency stop. If a flight team member interacts with the drone, controller or coding device the drone must be reset as described in 4.1.3 before additional points can be earned.

4.1.3 The drone can be reset as a strategy

The flight team can reset their drone to a legal starting position as many times as needed/desired during solo autonomous flight matches. The match timer will continue to run

Copyright 2026, Robotics Education & Competition Foundation

during the reset. Hand catching the drone to perform a reset is permitted, provided no other safety or competition rules are violated.

Note: If a drone lands during a match, it may continue to complete additional tasks and earn points as long as the program continues without human interaction. In this case, the drone does not need to be reset.

4.1.3.1 Actions permitted during a reset

While resetting the drone, the flight team can make necessary repairs, replace batteries, and/or revise code as desired. They are not permitted to switch drones during the 3-minute match period.

4.1.3.2 Completing a reset

If any field elements are displaced during the reset, they must be returned to their proper positions before continuing the match. After handling, the drone must return to a legal starting position and the flight team can start another program.

4.2 Solo Autonomous Flight Mission Scoring & Additional Scoring Criteria

Scoring Task	Points	Max per Match
Take off	5 points	1
Fly under the red arch gate	5 points	2
Fly under the blue arch gate	5 points	2
Fly through the green keyhole gate	10 points	2
Fly through the yellow keyhole gate	20 points	2
Fly through the large cube	25 points	2
Fly through mini keyhole #1 (lowest)	15 points	2
Fly through mini keyhole #2 (middle)	15 points	2
Fly through mini keyhole #3 (top)	15 points	2
Spiral bonus (3 mini keyholes in order)	10 points	2
Fly through the tunnel	15 points	2
Landing	5 points on a landing pad 10 points on any cube 15 points on a bullseye	Once, regardless of landing location

Copyright 2026, Robotics Education & Competition Foundation

4.2.1 Tasks can be repeated

Flight teams can complete solo autonomous coding mission tasks in any order, and continue to earn points for repeated tasks throughout the match. Each task can be completed a limited number of times, as listed in the table above.

4.2.2 Spiral bonus criteria

A Team earns the spiral bonus if the drone flies through all three small keyholes in ascending order (1 → 2 → 3) as shown in figure 4.2.2 without completing any additional scoring tasks in between. Order is strictly enforced; any deviation or interruption disqualifies the spiral bonus.

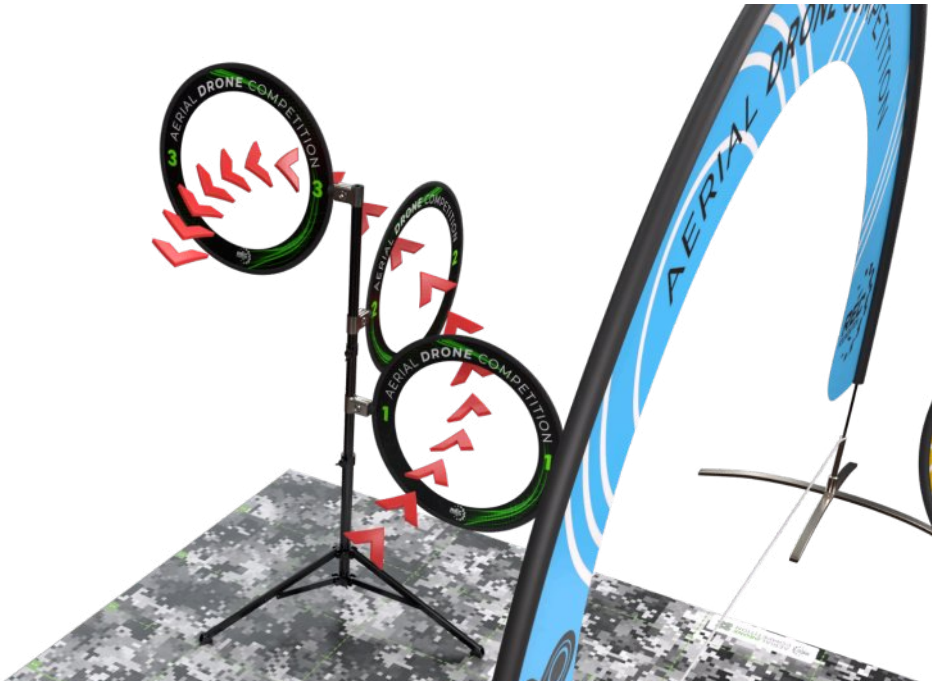


Figure 4.2.2: Spiral bonus path

Copyright 2026, Robotics Education & Competition Foundation

Section 5: Fast Track Alliance/Teamwork Mission

In the Fast Track alliance/teamwork mission, teams have 90 seconds to score as many points as possible. Each match includes two teams, who work together to earn a shared score for the match. Skipping an alliance match will be considered a violation of the RECF Code of Conduct.

Many of the scoring criteria in Section 3.1 also apply in alliance matches.

5.1 Alliance Match Scoring & Scoring Criteria

Scoring Task	Points	Max per Match
Each ball in a goal	2 points	
Goal bonus	5 x the number of balls in the goal with the fewest balls scored	1
Each ball in a scoring zone	1 point	
Each bean bag cleared	10 points	2
Completed flight path	10 points	1 per drone
Landing	15 points on a large cube 20 points on a small cube	Maximum of 1 drone per cube

5.1.1 Ball in a goal

A ball is considered scored in a goal if the ball is partially or fully inside the goal as shown in figure 5.1.1.

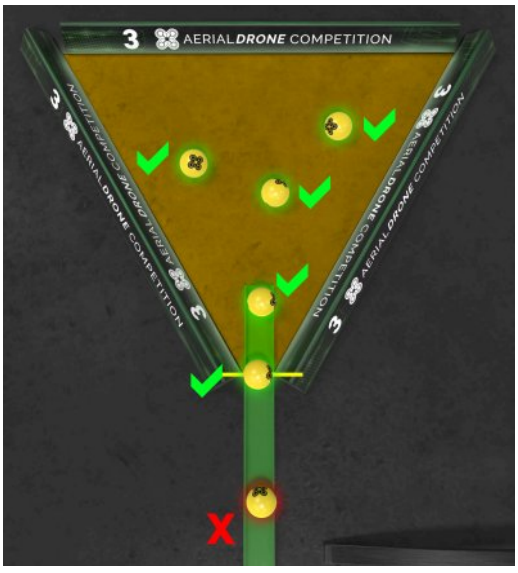


Figure 5.1.1: Balls inside and outside of a goal

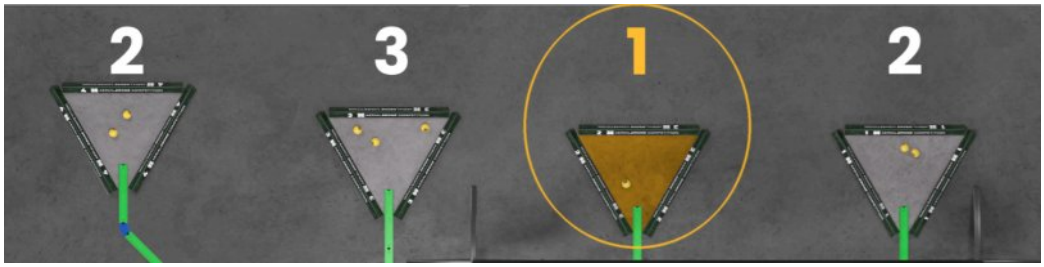
Copyright 2026, Robotics Education & Competition Foundation

5.1.2 Goal bonus

The goal bonus rewards teams for placing balls in all goals and is calculated based on the goal with the fewest balls scored. Each ball in that goal contributes 5 points to the goal bonus.

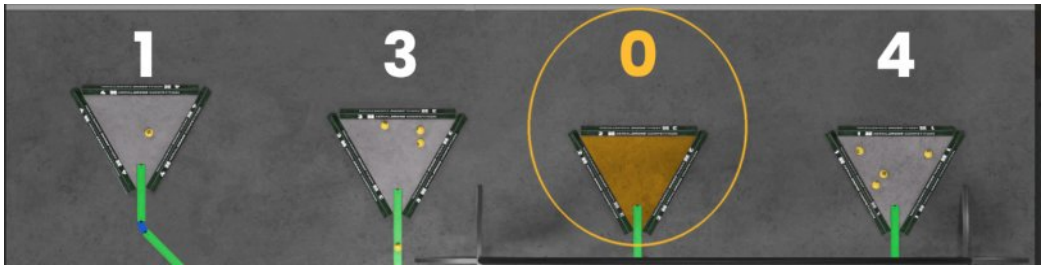
Example 1: The lowest-scoring goal contains 1 ball

- Goal bonus = 1 × 5 = 5 points; the alliance earns 5 points from the goal bonus.



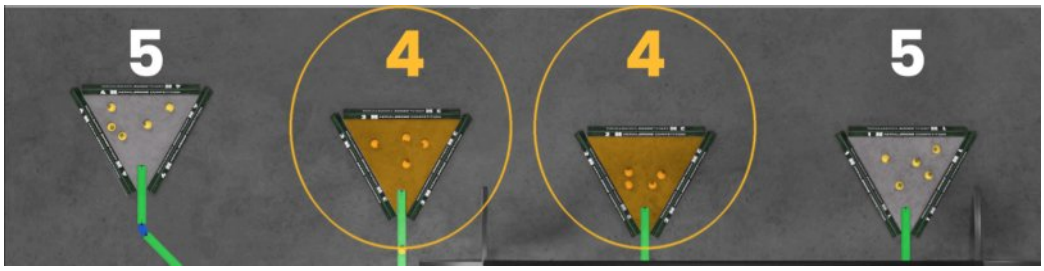
Example 2: The lowest-scoring goal contains 0 balls

- Goal bonus = 0 × 5 = 0 points; the alliance earns 0 points from the goal bonus.



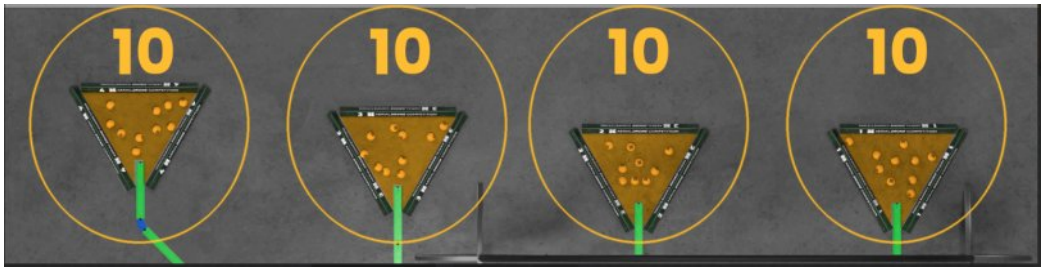
Example 3: The lowest-scoring goal contains 4 balls

- Goal bonus = 4 × 5 = 20 points; the alliance earns 20 points from the goal bonus.



Example 4: The lowest-scoring goal contains 10 balls

- Goal bonus = 10 × 5 = 50 points; the alliance earns 50 points from the goal bonus.



Copyright 2026, Robotics Education & Competition Foundation

5.1.3 Ball in a scoring zone

A ball is considered to be scored in a scoring zone if the ball Is on or beyond a yellow segment of the track and not in a goal. The scoring zones are highlighted in yellow in figure 5.1.3.

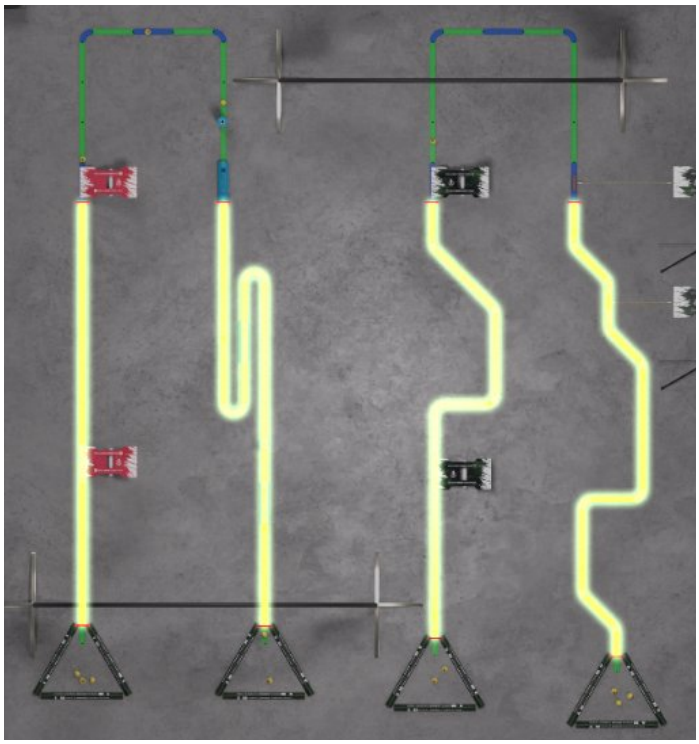


Figure 5.1.3: Scoring zones highlighted in yellow

5.1.4 Bean bag cleared

A bean bag is considered cleared when it is no longer touching the platform of a high switch.

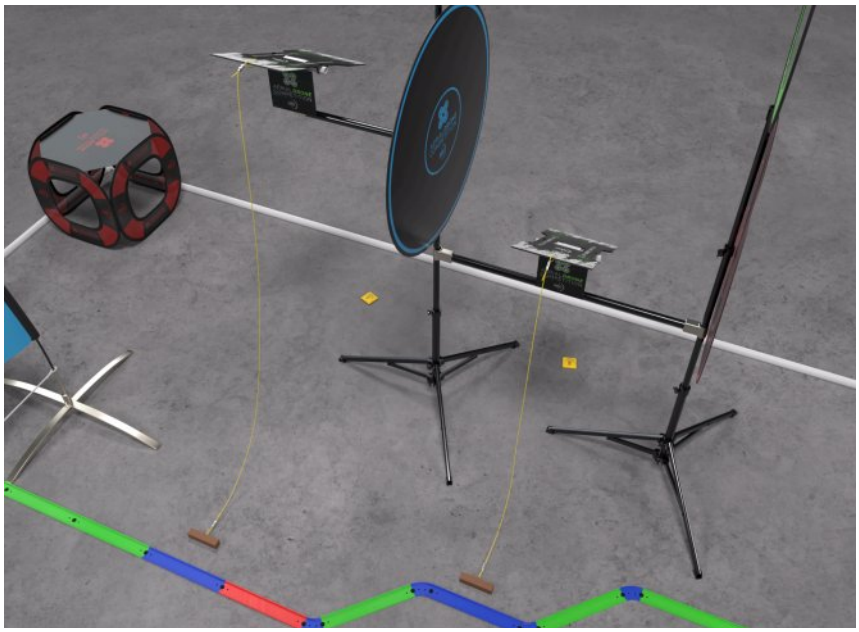


Figure 5.1.4: Two cleared bean bags

Copyright 2026, Robotics Education & Competition Foundation

5.1.5 Flight path completed

The Fast Track alliance flight path can only be attempted during the final 30 seconds of a match, and each drone can only earn points for one completed flight path per alliance match.

The Fast Track alliance flight path has five steps, which must be completed in order and in the specified directions (see figure 5.1.5). Any deviation in order, direction, or gate interaction will result in the attempt being incomplete, and 0 points for that flight path attempt.

1. Fly through the green keyhole gate.
2. Fly through the yellow keyhole gate.
3. Fly under the blue arch gate.
4. Fly around and under the red arch gate.
5. Fly under the blue arch gate again.

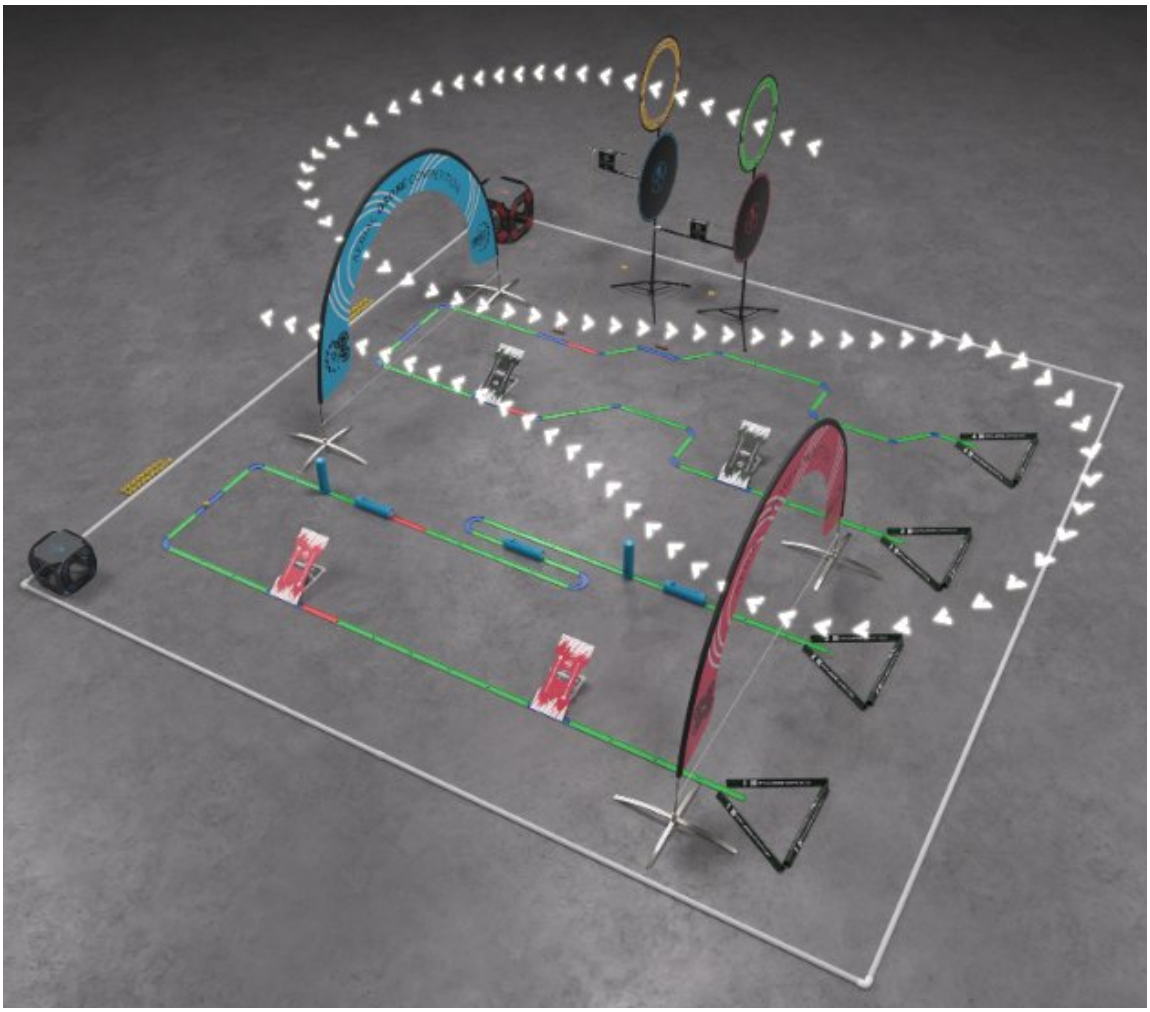


Figure 5.1.5: Fast Track alliance match flight path

Copyright 2026, Robotics Education & Competition Foundation

5.1.6 Landing on a cube

A drone is considered landed on a cube if it meets the criteria in rule 3.1.15 at the end of the match. If multiple drones land on the same cube, only one drone will be considered landed. All additional drones contacting or occupying that cube will be considered not landed and will receive no landing points.

Note: The rules for landing on a cube are different from previous seasons. Teams should carefully read the criteria for landing on a cube.

5.2 Starting Positions

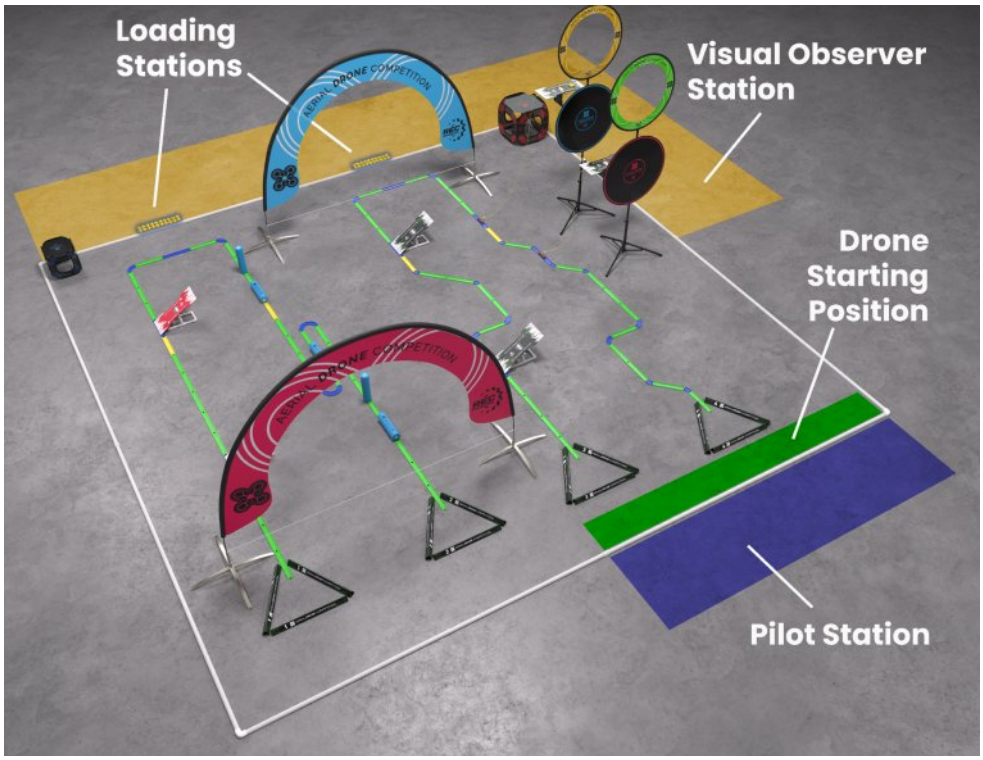


Figure 5.2: Fast Track alliance match stations and zones

5.2.1 Flight team member positions and roles

Up to three student team members (the flight team) can come to the field for each alliance match. Flight team members may not enter the field during a match.

Flight team members can't wear headphones or communicate with anyone beyond the field during the match, and spectators or non-flight team students can't coach the flight team or approach the field.

Sitting or standing on chairs/stools for support or elevation is only allowed if approved by the RECF through an accommodation request.

Copyright 2026, Robotics Education & Competition Foundation

5.2.1.1 Pilots and pilot station

The pilot and co-pilot must remain within the pilot station, as shown in figure 5.2, unless briefly stepping out for safety. They may move freely within the boundaries of this station to operate equipment, communicate, and collaborate. Only the pilot and/or co-pilot can operate the drone during the match.

5.2.1.2 Visual observer

The visual observer must remain within the visual observer station, as shown in figure 5.2, unless briefly stepping out for safety. They may move freely within the boundaries of this station to place balls into the loading zones, communicate, and collaborate safely with other flight team members, including their pilot and co-pilot.

5.2.2 Drone starting positions

Each team's drone must meet all of these criteria at the beginning of the match:

- Contacting the floor adjacent to the pilot station, as shown in figure 5.2.
- Within arm's reach of that team's pilot.
- Not touching any field elements.
- Not touching another drone.
- The drone's propellers may be in motion before the match begins, but the drone must remain on the ground until the match begins.

5.3 Match Play

5.3.1 The drone can only operate while the match timer is counting down

Drones can't be in flight before the match timer begins counting down from 90 seconds, and have to stop when the timer hits 0. Points scored after the timer reaches 0 will be deducted before the score is submitted, and the team will still receive a foul.

5.3.2 The drone must clearly display its assigned color during the match

Each team in a match must change the light on the top of their drone to red or blue to display their team's assigned color for that match. If the drone does not have a light, the team must use an alternative method, such as colored tape, to clearly indicate their assigned color.

5.3.3 Balls that leave the track aren't returned

Any ball that leaves the track during a match is considered out of play for the rest of that match and cannot be reintroduced. Balls that leave the track should not be recorded as a foul.

5.3.4 Team-loaded balls

A visual observer can gently place balls from the supply in either loading station into the adjacent loading zone during the match (not before!). Visual observers may pick balls up before the match starts. Each ball can only be placed in the adjacent load zone; transferring balls between loading stations is not allowed.

Copyright 2026, Robotics Education & Competition Foundation

There is no limit to the number of balls that may be placed in a loading zone; however, once a ball is placed on the track, it cannot be touched or removed by the visual observer. The visual observer's hands will momentarily enter the field to place balls on the track; they should be mindful of nearby drones and remove their hands as quickly as possible.

5.3.4.1 Ball movement after loading

Balls may naturally roll along the track after being placed by a visual observer. This is expected and permitted. However, any ball that enters a scoring zone as a result of intentional human action (including pushing, flicking, or deliberate motion) will be considered a foul and will result in a red card for that team.

Visual observers should make it abundantly clear that they are not pushing the balls. Referees will determine intent based on observable applied force. If intent is unclear, the movement will be ruled as natural and not a foul.

5.3.5 Field element supports and tension wires

While there is no rule prohibiting your drone from contacting field elements, supports, or tension wires (e.g., the tension wire between a high switch and a block), doing so is at your own risk and may result in a crash and/or damage to the drone.

5.4 What Happens When Things Go Wrong

The guidance in section 3.4 also applies in alliance matches unless specifically revised below.

5.4.1 Missed match or late to a match

If no member of a team is present in either the pilot station or visual observer station at the scheduled start time for a match (or, for finals matches and/or when the event is running behind schedule, when the match is otherwise ready to begin), the team will be marked as absent from that match. They will not earn points for that alliance match; the score for the other team in the match is not affected.

5.4.2 At the field, but not ready to play

If a team is not ready to play at the scheduled match time (or, for finals matches and/or when the event is running behind schedule, when the match is otherwise ready to begin), the head referee may ask the team to remove their drone from the field. If at least one member of the flight team remains at the field, they will still receive a score for the match.

Copyright 2026, Robotics Education & Competition Foundation

Section 6: Communications Mission

At events that offer judging, teams will participate in an interview with judges to answer questions about their team, drone, code, and strategies; each team must be offered an equal opportunity to be interviewed. Teams also submit their competition notebooks for review by judges.

Each team interview lasts about 10 minutes and in-person interviews generally take place between matches. Judges use the Team Interview Rubric and Competition Notebook Rubric to evaluate and rank teams. Teams are encouraged to review these rubrics in advance.

See the ADC Guide to Judging for more information about judging and awards.

6.1 Competition Notebook

A competition notebook is a record-keeping tool that provides students with an opportunity to develop essential skills such as project and time management, brainstorming, and both written and interpersonal communication. Teams are encouraged to document their use of the iterative design process, including details of successes and challenges. All documentation and work related to the competition notebook must be completed by the students, and they can't use AI-generated content. To learn more about competition notebooks and the iterative design process visit the RECF Library.

Teams can maintain their notebooks using either a traditional physical notebook or a range of digital tools, such as software applications or cloud-based platforms. Some events may only accept physical notebooks, while others may require digital submissions. In these cases, physical notebooks can be scanned and submitted electronically, and digital notebooks may be printed for submission. Be sure to check the event details on RECFevents.org to confirm which format is accepted.

6.2 Team Interviews

Team interviews are face-to-face (or virtual) conversations between a team of students and two or more volunteer judges. Interviews are opportunities for teams to share their match strategies, learning experiences, and overall approach to the Aerial Drone Competition.

6.3 Award Deliberation

Award deliberation is the last step in the judging process. In this step, judges work with the judge advisor and one another to select candidates for each award.

The Competition Notebook Rubric and Team Interview Rubric are tools to assist with deliberations. A team's score, whether a specific line item on a rubric or the overall score, is a data point that the judges can use as a part of the process. It is not a replacement for qualitative judgments in the deliberation process.

Judges will choose winners of each award based on the specific award criteria in the ADC Guide to Judging. No team may receive more than one judged award at an event.

Copyright 2026, Robotics Education & Competition Foundation

Section 7: Event Personnel, Processes, & Guidelines

7.1 Event Personnel

7.1.1 Event Partner

An event partner is a certified volunteer who runs an event using the guidelines in RECF's policies and game manuals. RECF event partners must be at least 18 years old, and can't serve as a head referee or judge advisor at their event. Event partners oversee the activities in this section of the game manual, and can add specific rules based on their site and event. Event partners cannot make decisions about match scores or rulings, cannot determine penalties for fouls, and cannot influence who receives judged awards. Event partners have the final decision on non-match and non-drone decisions at an event.

7.1.2 Head Referee

A head referee is a certified volunteer who has been assigned by the event partner to oversee matches using the guidelines in the game manual. ADC head referees must be at least 20 years old. Head referees work with team members to prevent and avoid fouls, and communicate fouls and penalties to teams when they occur. Head referees have the final decision on all match and drone rules, and should train inspectors and scorekeeper referees at events as appropriate.

Every alliance match must be watched by at least one head referee, and a head referee must be available to assist at inspection and solo matches as needed. See this article and related content in the RECF Library for more information.

7.1.3 Scorekeeper Referee

Scorekeeper referees score all varieties of match, and can oversee solo matches independently. ADC scorekeeper referees must be at least 15 years old. Every solo match must be watched by at least one referee. If there's a question about scoring or match play that doesn't have a clear answer in the game manual, scorekeeper referees should consult a head referee before answering. See this article and related content in the RECF Library for more information.

7.1.4 Judge Advisor

A judge advisor is a certified volunteer who trains and oversees volunteer judges at an event using the guidelines in the ADC Guide to Judging. ADC judge advisors must be at least 21 years old. See this article and related content in the RECF Library for more information.

7.1.5 Judge

A judge is a volunteer who reviews teams' competition notebooks and/or interviews teams about their processes, then deliberates with other judging volunteers to identify award

Copyright 2026, Robotics Education & Competition Foundation

candidates and select award winners. ADC judges must be at least 16 years old; for any event that includes high school (19U) teams, judges must be at least 20 years old. See this article and related content in the RECF Library for more information.

7.1.6 Inspector

An inspector is a volunteer who confirms that teams' equipment meet the requirements in the game manual. If there's a question that doesn't have a clear answer in the game manual, inspectors should consult a head referee.

7.1.7 Field Resetter

A field resetter is a volunteer who ensures that all objects on the field are in the correct positions at the beginning of each match. Field resetters should not begin to reset a field after a match until a referee directs them to do so. See this article and related content in the RECF Library for more information.

7.1.8 Queuer

A queuer is a volunteer who ensures that the correct teams are at the correct alliance matches. If time allows, they can attempt to locate teams who haven't checked in for upcoming matches, but they are not required to do so. See this article and related content in the RECF Library for more information.

7.1.9 Emcee

An emcee is a volunteer who provides play-by-play information for the audience during alliance matches. Emcees should avoid suggesting strategies, and cannot simultaneously serve as referees. See this article and related content in the RECF Library for more information.

7.2 Event Processes

7.2.1 Team Check In

Each team must check in when they arrive at the event, and confirm that at least one adult will remain onsite to supervise team members for the entire event. Some events use team check-in as a way to distribute event hand-outs like nametags, site maps, general schedules, and lunch order forms. Team check-in often occurs at a visible location just inside the main doors of the venue.

7.2.2 Inspection

Each team must pass an inspection before they can participate in any type of match at an event. Volunteer inspectors will confirm that the team's drones meet the requirements in the game manual, and will mark passed inspections in C². Inspection often occurs at a table near the competition fields or in the team pit area.

Copyright 2026, Robotics Education & Competition Foundation

7.2.3 Creating the Alliance Match Schedule

If any teams have not checked in, or any teams haven't passed inspection, the event partner should resolve them before creating the alliance match schedule in C². The alliance match schedule should only include teams who will participate in alliance matches. See rule 7.4.2 for more information.

7.2.4 Queueing

Teams should check in at the queuing table(s) before their scheduled alliance match time, and will be routed to the correct field by volunteer queuers. Queueing generally occurs at a set of tables near the alliance match fields, with one table for each named competition field. Providing tables gives teams a safe place to put their drones & controllers while they wait for upcoming matches. Tables are also recommended at the line for solo matches.

7.2.5 Running Matches

To display a match timer on a connected display, a referee or emcee can select an alliance match by match number in C², or a solo match by team number and match type. The referee or emcee should confirm that the flight team members are ready, then activate the match timer from a device connected to C².

After the match completes, referees should score the match and confirm object counts for each scoring category with the flight team members before submitting the match score and moving to the next match.

7.2.6 Alliance Selection / Elimination Matches

At the end of alliance matches, the event partner should identify any teams that are unavailable or ineligible to participate in alliance selection and mark them in C². Once teams are removed from the list, the event partner can determine the number of alliances that will participate in alliance selection and initiate the alliance selection process. Once alliance selection is complete, the event partner will create the elimination matches in the C² software. See rule 7.4.4 for more information.

7.2.7 Entering Award Winners

After the judging volunteers have selected the winners of all judged awards listed for the event, the judge advisor and event partner should work together to enter winners in C². They should confirm the base number and team letter for each winner, and ensure that no team is marked to receive more than one judged award. Winners of performance awards are automatically marked by C².

7.2.8 Finalizing an Event

After matches and awards conclude, the event partner should finalize and upload the tournament information to RECFevents.org. Some events (e.g., multiple divisions) may need to work with RECF staff to finalize their results.

Copyright 2026, Robotics Education & Competition Foundation

7.3 Field Parameters

See the ADC Fast Track Game Element Assembly Instructions for Fast Track field element assembly instructions, setup details, and field measurements.

7.3.1 Equipment

All of the fields used for alliance matches at an event should have the same flooring, and all of the fields used for solo matches at an event should have the same flooring. For example, an event could put all of the alliance match fields on low-pile commercial carpet and all of the solo match fields on laminate flooring. Recommending flooring types include hardwood, laminate, concrete, and low-pile commercial carpet.

Event partners may provide containers to hold the supply of balls at each loading station. All containers used at an event must be identical in size and shape across all loading stations at that event.

7.3.2 Variances

Although fields and setups should be as identical as possible, teams have to be prepared for some amount of variance. Positions of field elements and boundaries may vary up to ±3” in any direction. Starting locations for game elements may vary up to ±1” in any direction.

7.4 Match Parameters

7.4.1 Solo Matches

Each team can attempt up to three solo matches of each type at an event (three solo piloting matches and three solo autonomous flight matches). These matches aren’t scheduled, and teams can make these attempts whenever their event schedule permits. Solo match fields should open early in the event, and remain open long enough to give each team an opportunity to complete their maximum number of solo matches. As a general rule, solo match fields should remain open until alliance matches have ended.

7.4.2 Alliance Matches

Each team will have at least six alliance matches at a qualifying event or at least eight matches at a championship event, which will appear on the match schedule generated by C². C² will assign alliance partners, match times, fields, and team colors as needed. Matches can only run early if the head referee and all teams are checked in for the match and ready to play.

For each set of four alliance matches a team runs, one of their lowest scores from the event is dropped when calculating their event ranking. For example, at events with 4-7 matches per team, each team’s lowest score will not affect their ranking; at events with 8-11 matches per team, each team’s two lowest scores are dropped.

Copyright 2026, Robotics Education & Competition Foundation

If a team is marked with an asterisk (*) for one of the last matches on the schedule, their score for that match won't affect their ranking. This occurs when extra matches are necessary to provide each team with the same minimum number of matches. Teams should remember that the RECF Code of Conduct includes supporting alliance partners, and do their best even though it won't affect their ranking.

7.4.3 Practice Matches

Some events choose to include scheduled practice matches that occur before official alliance matches begin. Practice matches aren't required, and the scores don't affect teams' rankings.

7.4.4 Alliance Selection

Teams' scores from alliance matches are used to rank them for alliance selection. The number of alliances is determined by the number of eligible teams, as detailed below:

Number of eligible teams	Number of alliances	First stage of the elimination bracket
20 or more	10	Quarterfinals
8-19	4	Semifinals
7 or fewer	2	Finals

Each team at the event must send one student to represent the team for alliance selection. No communication devices are allowed during alliance selection. Any electronics such as phones or tablets must be in airplane mode and disconnected from wi-fi during alliance selection. Decisions related to alliance selection must be made by the students on the team.

Alliance selection will begin with the representative from the highest ranked team inviting any eligible team of their choice to become alliance partners. The invited team's representative then has the opportunity to either accept or decline the offer. If the offer is declined, the invited team cannot be invited to another alliance, and will only be able to be the inviting team if they are ranked highly enough to have that opportunity. Team representatives should be mindful of the number of teams being included in elimination rounds before declining an invitation.

Once the first alliance is formed, the next highest ranked team's representative will be given the opportunity to invite a team to become alliance partners. This process will continue until the number of alliances set by the event partner have been established.

7.4.5 Elimination Matches

Elimination matches are played sequentially in rounds, beginning with the lowest-ranked alliance. At the end of each round, the highest-scoring alliances will move on to the next round as shown in figure 7.4.5-F1 and all rankings are recalculated based on scores from the previous round.

Copyright 2026, Robotics Education & Competition Foundation

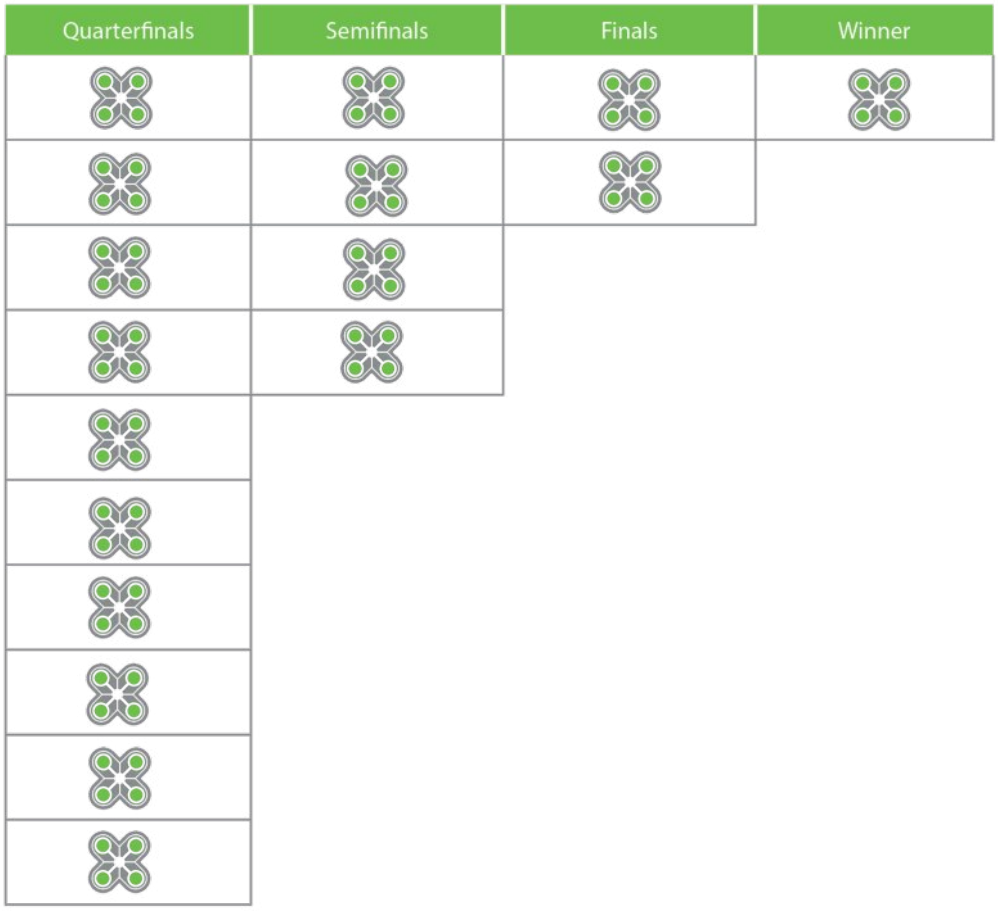


Figure 7.4.5-F1: The rounds in a set of ADC elimination matches

Additional alliances may progress to the next round based on tied scores as needed. In the example shown in figure 7.4.5-F2, all five teams marked with a star would progress to the semifinals based on the tied 80-point score.

Example			
★ **Alliance 1**	**100 points**	Alliance 6	75 points
★ **Alliance 2**	**90 points**	Alliance 7	60 points
★ **Alliance 3**	**85 points**	Alliance 8	60 points
★ **Alliance 4**	**80 points**	Alliance 9	50 points
★ **Alliance 5**	**80 points**	Alliance 10	40 points

Figure 7.4.5-F2: Tie for 4th place in the quarterfinal round

The two-team alliance that records the highest score in the finals round will be named the teamwork champions. If there's a tie for first place, the teams will participate in one or more tiebreaker rounds; early stop times may be considered if a 2nd set of tiebreakers is needed. If a 3rd set of tiebreakers is needed, the alliances' scores from previous rounds will be considered.

Copyright 2026, Robotics Education & Competition Foundation

7.4.6 League Events

Information on how leagues qualify teams to event region championships or the RECF World Championship can be found in the ADC Qualifying Criteria.

Leagues are events that are scheduled over multiple sessions spread across several weeks, and some match parameters differ for teams competing in leagues.

- **Minimum participation:** A minimum of two alliance matches per team are required at each league session, and teams will be ranked by the number of matches played and their average scores. Teams that play in at least 60% of the sessions will be ranked higher than those who play in fewer sessions.
- **Fouls:** Because a league is considered a single tournament, all fouls and foul cards stay with the team across all league sessions. Any team that receives three or more red cards throughout sessions for a single league cannot be part of alliance selection at the league championship elimination bracket.

Copyright 2026, Robotics Education & Competition Foundation