



# ***RULES & REGULATIONS***

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# 1. INTRODUCTION

## Purpose and Scope

Our indoor drone racing rules and regulations are meticulously crafted to govern and facilitate competitive drone racing. Our primary objectives are to create an environment that promotes safety, education, and excitement for all participants, especially students. Our commitment extends to:



### STEM Education:

We are dedicated to advancing STEM (Science, Technology, Engineering, and Mathematics) education through thrilling indoor racing competitions. Our races serve as a platform to inspire students to explore the world of drone technology, sparking their curiosity and passion for science and engineering.



### Skill Development:

Our focus lies in organizing and participating in indoor drone racing events that foster the development of piloting skills. Through these competitions, participants have the opportunity to improve their piloting abilities, problem-solving skills, and strategic thinking.



### Community Building:

We strive to build a vibrant and supportive community of drone enthusiasts. Our events bring together like-minded individuals who share a common passion for drone technology, creating networks and friendships that extend beyond the racetrack.



### Team Building:

Teamwork is at the heart of our organization. We aim to instill essential team-building skills, emphasizing collaboration, communication, and camaraderie among participants. These skills are not only valuable in the world of drone racing but also in life.



### Safety and Risk Management:

Ensuring the safety and well-being of all participants during your racing activities is of paramount importance. We implement stringent safety measures, detailed in the following sections, to mitigate risks and create a secure environment for all.



## 2. TRAINING AND EDUCATION

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Before joining the Rocket Drones team and embarking on an exhilarating journey of indoor drone racing, it's essential for all prospective members to undergo some training and education. Our commitment to safety, sportsmanship, and skill development begins with a foundation of knowledge and practical experience. This section outlines the essential training modules that aspiring team members should complete before they become official Rocket Drones participants.

### Introduction to RocketDrones University

Our indoor drone racing rules and regulations are meticulously crafted to govern and facilitate competitive drone racing. Our primary objectives are to create an environment that promotes safety, education, and excitement for all participants, especially students. Our commitment extends to:

### Introduction to Indoor Drone Racing

The Introduction to Indoor Drone Racing course delves into the fundamentals of drone technology, flight dynamics, and safety. Participants learn the following key concepts:



#### Drone Anatomy:

A detailed examination of drone components and their functions, allowing participants to understand the intricacies of the aircraft they'll be racing.



#### Flight Physics:

Exploring the principles of aerodynamics, drone maneuverability, and factors affecting flight stability.



#### Safety Protocols:

Emphasizing the importance of safety in drone racing, this module covers best practices, emergency procedures, and risk mitigation.

Team members should complete Introduction to Drone Racing before participating in any Rocket Drones sponsored indoor race.

## 3. BASIC DRONE SAFETY

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#### Safety First:

Emphasize safety and sportsmanship as top priorities. Unsafe drone operations, such as dangerous flying or not following directions, may lead to disqualification. Serious breaches can result in exclusion from the race. Our Quick Reference Safety Checklist can be found [here](#).



#### Eye Protection:

Mandate eye protection for all, including Pilots, Team members, and Team coaches while drones are in the air. FPV goggles are considered safe eye protection.



### Hair Safety:

Encourage pilots with long hair to tie it up or wear suitable headwear to prevent entanglement with drones. The protocol for handling entangled hair includes turning off the drone by disconnecting the battery, and safely removing the prop.



### Race Course Access:

No one should enter the race course area during live races or practice sessions without coach/race manager approval. Violators should face consequences, including disqualification or ejection.



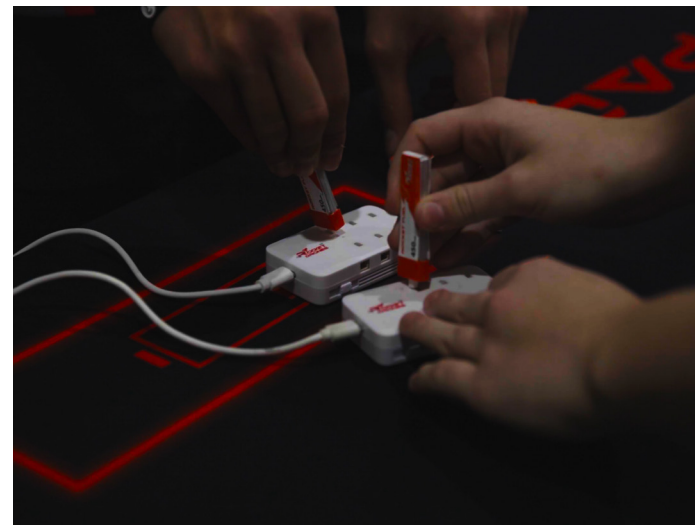
### Safe Drone Retrieval:

After landing and disarming, pilots can retrieve drones from the race course while wearing eye protection. Battery disconnection is immediate.



## Lithium Polymer Battery Charging Criteria

- Verify battery voltage before each flight.
- Allow discharged batteries a cooldown period of 2-5 minutes before charging to preserve their lifespan. Do not charge swollen or damaged batteries.
- Charge batteries only in designated Charging Zones defined by the coach/race manager.
- Isolate charging areas from the Race Area and ensure distance from spectators. Keep a fire extinguisher accessible, as LiPo battery issues can lead to fires. Make everyone aware of the first-aid kit and fire extinguisher's location.





### **Drone Power-Up:**

Drones may be powered up only when a pilot is about to participate in a race or practice session. Failure to comply may lead to disqualification



### **Launch Protocol:**

Once powered on, place the Rocket Drone on the launch pad in the designated space. The pilot should confirm readiness with the race manager before takeoff.



### **Post-Race Procedure:**

After a practice or race, pilots should aim to land on the pad. When all drones are safely disarmed, pilots can switch to the provided eye protection and retrieve drones from the race area.



### **Handling Rogue Drones:**

In the event of a rogue drone (unresponsive to commands), the pilot must disarm the drone immediately to prevent potential injury or damage.



### **Overheating:**

Do not leave any equipment plugged in and unattended. Drones can overheat if left plugged in and not in flight.



### **Safety Measures for Spectators:**

Eye protection is advised for all spectators. Seating area should be away from any potential wipe out zones.

## **4. TEAM FORMATION**

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### **Team Formation:**

The formation of race teams within the Rocket Drones Race League is a collaborative process led by our dedicated team coaches. Coaches play a pivotal role in guiding the formation of teams, ensuring a fair and inclusive environment. Team formation may involve various approaches, such as open enrollment, tryouts, or skill-based placement, depending on the preferences of the coach and the dynamics of the school's program. Simulator tryouts are ideal for larger student groups. Students may qualify with our simulator utilizing the tryout mode where a timed leaderboard can be used to generate the 1-24 team member race team.

# 5. MEMBERSHIP AND ELIGIBILITY



## Eligibility Criteria:

We welcome participants of all skill levels, from those taking their first steps in drone piloting to seasoned racers. Our program is designed to be inclusive, accommodating both middle school and high school students. Our primary objective is to provide opportunities for personal growth, skill development, and fostering a passion for technology. We encourage students to explore the world of drone technology, offering them a platform to learn and excel.



## Age Restrictions:

While the Rocket Drones Race League is primarily tailored for middle school and high school students, we understand that age ranges can vary. Typically, middle school students fall within the age range of 11 to 14, while high school students typically range from 14 to 18 years old. Our program aims to provide an engaging and educational experience for students within these age groups. However, we recognize that unique circumstances may arise, and we are open to making exceptions on a case-by-case basis to ensure all passionate individuals have the opportunity to participate.



## Skill Levels:

We believe in the power of inclusivity and welcome participants of all skill levels. Whether you're a novice pilot just starting your drone journey or an experienced racer with numerous flight hours under your belt, there's a place for you within our community. Our program is structured to cater to individuals with varying degrees of expertise. We value the diverse perspectives and experiences that participants bring to our community.



## Prerequisites:

We hold no specific prerequisites for joining our team. The key requirements are a genuine interest in drone technology and a commitment to upholding our core values of safety and sportsmanship. Rocket Drones Race League is committed to providing the support and resources needed for every participant to learn, grow, and thrive in a welcoming and nurturing environment.

By focusing on inclusivity and the individual's commitment to our safety and sportsmanship principles, we aim to ensure that our Rocket Drones Race League becomes an accessible and enriching experience for students of diverse backgrounds and interests. We're excited to have you join us on this thrilling journey into the world of indoor drone racing.





# 6. TEAM STRUCTURE AND LEADERSHIP

The success of the Rocket Drones Race League relies on a well-organized and efficient team structure. Each role within the team plays a pivotal part in ensuring that races and practice sessions run smoothly while emphasizing safety, competitiveness, and sportsmanship. Here, we outline the various roles that make up the core of our team structure:

## 6.1. Roles



### Race Manager & Safety Officer:

This individual oversees all aspects of race management and ensures the safety of team members and spectators during races and practice sessions. These roles can be separated into two if you have the available team members.

#### *Responsibilities*

- Set up and manage race courses, including gates, obstacles, and timing systems.
- Enforce safety protocols, including spectator boundaries, pilot safety gear, and emergency response procedures.
- Coordinate race schedules and communicate them to team members and participants.
- Address safety concerns and make necessary adjustments to race conditions.
- Act as the primary point of contact for race-related inquiries.



### FPV Racer:

FPV racers are the pilots who operate the racing drones during practice sessions and competitions

#### *Responsibilities*

- Master the art of flying FPV drones, including precise control, obstacle navigation, and racing maneuvers.
- Participate in practice races and competitions to represent the team.
- Collaborate with the Flight Engineer for drone maintenance and repairs.
- Follow race strategies and adapt to changing race condition



### Visual Observer:

Visual observers play a crucial role in assisting FPV racers by providing real-time visual information about the drones' positions and obstacles

#### *Responsibilities*

- For FPV racers: Watch the live video feed from the racer's goggles and verify the drone successfully passes through each gate.
- For Line-of-Sight (LOS) racers: Keep visual contact with the drones, ensuring they successfully pass through each gate.
- Communicate effectively with the racers to enhance their situational awareness if needed and requested by the FPV racer.



## Flight Engineer:

The Flight Engineer is responsible for drone maintenance, inspections, and battery management to ensure that all equipment is in optimal condition.

### *Responsibilities*

- Perform pre-flight and post-flight inspections to check for any issues or damage to the drones.
- Manage and maintain drone batteries, ensuring they are charged, balanced, and ready for flights.
- Assist with repairs and troubleshooting as needed.
- Keep inventory of spare parts and order replacements when necessary.



## Announcer (Optional):

The announcer provides commentary and race updates during competitions, adding excitement and engagement for the audience.

### *Responsibilities*

- Commentate on race progress, providing details on racers, lap times, and exciting moments.
- Engage the audience by explaining the rules and strategies involved in FPV drone racing.
- Keep the audience informed and entertained throughout the event.



## Live Streamer (Optional with the purchase of the 4 way HDMI Drone Video Receiver):

The live streamer is responsible for capturing and broadcasting the races online to a wider audience.

### *Responsibilities*

- Set up cameras and equipment to capture high-quality video of the races.  
Ensure a stable and engaging live stream, including commentary and graphics.
- Share the live stream on social media and other online platforms to reach a broader audience.
- Interact with viewers, answer questions, and provide race updates during the broadcast.



# 7. CODE OF CONDUCT & DISPUTES

## 7.1. Guidelines for Everyone



### Listen and Follow Instructions:

Respect and follow all instructions given by the Team Coach(s), the race manager or safety officer. Their guidance is vital to ensuring a safe and organized race environment.



### Course Safety:

Never enter the race course while drones are actively flying. After a race, immediately power down any retrieved drones to clear the video channel and prevent accidental motor activation.



### Emergency Preparedness:

Know the emergency exits and the locations of the first aid kit and fire extinguisher for quick access in case of emergencies.

## 7.2. Guidelines for Pilots



### Designated Areas:

Fly your drone only in the designated areas and during authorized times.



### Maintain Distance:

Keep your drone at least 25 feet away from the pilot area to avoid interference with other pilots' video reception.



### Landing Protocol:

After completing a race, land in the designated launch pad area on the course.



### Visual Observer:

Always have a Visual Observer present in the Pilot Area while flying. The Visual Observer's role is to watch for potential dangers, such as spectators, animals, or other pilots, unless otherwise directed by the Team Coach(s).



### Race Conclusion:

After your race, avoid "freestyling" and proceed to fly your drone to the designated landing area for a safe landing. Additional bonus points are available to those that successfully land on their designated landing pad in some race formats.



### **Sportsmanship:**

Display proper sportsmanship and conduct at all times. Poor conduct includes actions that affect another pilot's race or equipment through speech or tampering, as well as any aggressive behavior.



### **Respect and Courtesy:**

Harassment of coaches, pilots, sponsors, or spectators will not be tolerated.



### **Disqualification:**

Any pilot attempting to win by irregular means, failing to follow a Team Coach's instructions, disregarding safety rules, or engaging in unsportsmanlike behavior during a competition may face disqualification.

## **7.3. Dispute Resolution**

Disputes can arise within the team or during races, and it is important to have a fair and effective process for resolving them. Dispute resolution is a shared responsibility between the team coach and the race manager. The following steps provide a framework for addressing conflicts and reaching resolutions:



### **Open Communication:**

Encourage all team members to communicate their concerns and issues openly and respectfully. Disputes should be addressed as soon as they arise.



### **Initial Discussion:**

When a dispute occurs, the individuals involved should first attempt to resolve it among themselves through open and honest dialogue. If a resolution is reached at this stage, no further action is required.



### **Involvement of Race Manager:**

If the dispute cannot be resolved at the initial discussion level, it should be brought to the attention of the race manager. The race manager will act as a mediator and may offer guidance and solutions to facilitate resolution.



### **Involvement of Coach:**

In cases where the race manager's intervention does not lead to a satisfactory resolution, the matter should be escalated to the coach. The coach will assess the situation and may propose further actions, such as arbitration or additional penalties if necessary.



### **Arbitration:**

If the dispute remains unresolved after involving both the race manager and coach, an arbitration process may be initiated. An impartial third party or panel will be appointed to hear both sides of the dispute and make a final decision. This may include the entire team.



### Acceptance of Decisions:

All team members should be prepared to accept the decisions made by the coach, race manager, or arbitrator as the final resolution of the dispute. This acceptance is essential for maintaining a positive team environment and ensuring fair and consistent outcomes.



### Documentation:

It is important to document the details of any dispute, including the steps taken for resolution, to maintain a record of how conflicts were addressed. This documentation can be valuable for reference in case of similar issues in the future.

Disputes related to our National Qualifier will include an arbitration by Rocket Drones Staff if the dispute involves a leaderboard submission. This can range from time log verification to DVR footage discrepancies. Contact [support@rocketdrones.com](mailto:support@rocketdrones.com) for escalations.

## 8. ENFORCEMENT AND PENALTIES

At Rocket Drones, we are committed to upholding the highest standards of safety, sportsmanship, and fair play. Our rules and regulations serve as guidelines to ensure a secure and enjoyable experience for all participants. It is essential to understand that adherence to these rules is a collective responsibility, and violations may result in penalties. The enforcement of rules and the imposition of penalties are designed not only to maintain order but also to educate and encourage positive behavior.

### 8.1. Types of Violations and Penalties

#### 8.1.1. Safety Violations:

**Penalty :**

Depending on the severity, safety violations may result in warnings, disqualification from the race, or suspension from Rocket Drones events.

**Examples:**

Unsafe drone operations, reckless flying, failure to follow safety instructions, and not wearing required safety gear.

#### 8.1.2. Sportsmanship Violations:

**Penalty :**

Depending on the severity, safety violations may result in warnings, disqualification from the race, or suspension from Rocket Drones events.

**Examples:**

Harassment, taunting, intentional fouls, and other conduct that disrupts other students.

#### 8.1.3. Technical and Fair Play Violations:

**Penalty :**

Violations of technical specifications and fair play standards may result in warnings, disqualification from the race, or a points deduction.

**Examples:**

Using unauthorized equipment, modifying drones to gain a competitive advantage, or failing to comply with fair play guidelines.

## 8.1.4. Penalty Process:

### Warning:

In less severe cases, participants may receive a warning for their first violation. This serves as an opportunity for education and improvement.

### Disqualification:

Repeated or serious violations may lead to disqualification from a specific race or competition. Disqualified pilots will receive a score indicating they did not finish the race or heat (0).

### Suspension:

In cases of extreme or repeated violations, participants may face suspension from Rocket Drones events. The length of the suspension will depend on the nature and frequency of violations and is left to the coach's discretion.

### Loss of Eligibility:

Serious or consistent violations can result in the loss of eligibility to participate in Rocket Drones events for an extended period or even permanently.



### Consistency and Fairness:

The enforcement of penalties is carried out by the Race Manager, Safety Officer, and Coaches. It is done to maintain consistency and fairness in accordance with our principles of safety and sportsmanship. All participants are treated equitably, regardless of their position or reputation within the program.



### Education and Rehabilitation:

Rocket Drones believes in the value of education and rehabilitation. In some cases, participants who violate rules may be required to complete safety courses, attend sportsmanship workshops, or take specific actions aimed at understanding and correcting their behavior. These educational efforts are aimed at promoting growth and positive development. This is at the coach's discretion.



### Reporting Violations:

Any participant who observes a rule violation should report it to the Race Manager, Safety Officers, or Coaches. Reporting violations is a collective responsibility to ensure a safe and fair environment for everyone.



### Periodic Review:

The enforcement and penalties section is subject to periodic review. We believe in the importance of evolving with the needs of the Rocket Drones community. Participant feedback and program development may lead to adjustments and improvements in this section to better serve our students and instructors.



### Positive Reinforcement:

While penalties are essential for maintaining discipline, we also strongly encourage positive reinforcement. Participants who consistently demonstrate excellent conduct and sportsmanship will be recognized and rewarded, motivating others to uphold our program's values.

At Rocket Drones, our ultimate goal is to provide an enriching and enjoyable experience for all participants. The enforcement of penalties is a means to achieve this goal by ensuring that our program operates in a safe, fair, and sportsmanlike manner. We appreciate the cooperation of our students and instructors in upholding these values.

# 9. AWARDS AND RECOGNITION

We believe in acknowledging and celebrating the dedication, skills, and accomplishments of our participants. Our awards and recognition program is designed to motivate, inspire, and honor the achievements of students and teams. Below are the key elements of our awards and recognition system:



## Race Badges:

Our RocketDrones Race Portal is a hub of achievement recognition. Participants have the opportunity to collect a variety of digital badges that represent milestones and accomplishments in their drone racing journey. These badges are a visual testament to your progress, skills, and dedication.



## Leaderboards:

Compete against your peers and track your progress on our leaderboards. Whether you're striving for the fastest lap time, the most consistent performance, or other achievements, our leaderboards provide a competitive platform for all participants.



## Season Awards:

At the end of each season, we host a Season Awards Ceremony to celebrate the outstanding achievements of our participants. These awards recognize accomplishments such as Best Pilot, Most Improved, and other categories. Our hope is to inspire participants to continually strive for excellence.



## End-of-Season Championships:

Rocket Drones organizes end-of-season championships that bring together the best pilots and teams from the region. These events serve as the pinnacle of achievement in our program, where participants have the opportunity to compete at the highest level and gain recognition for their performance.



## Mentorship and Coaching Awards:

Acknowledging the role of coaches and mentors is integral to our program. We honor and recognize the dedication and guidance provided by instructors and mentors who help students succeed in the world of drone racing.



## Special Achievements:

In addition to the above categories, we also have a category for special achievements. These awards can vary from season to season and may include recognitions for creativity, innovative problem-solving, and team spirit.



## Scholarships and Prizes:

Rocket Drones is committed to providing educational opportunities for its participants. We offer scholarships and prizes to outstanding students, helping them pursue further studies and careers in STEM fields. Refer to [www.rocketdrones.com/scholarships](http://www.rocketdrones.com/scholarships) to learn more.



### Recognition in the Rocket Drones Community:

We feature award recipients in our Rocket Drones community channels, such as the website, social media, and newsletters. Recognizing and sharing their accomplishments with the broader Rocket Drones community is a source of pride and inspiration for participants.



### Certificates and Trophies:

In addition to digital recognition, we provide physical certificates and trophies to commemorate major achievements. These tangible awards can be displayed in schools, homes, or offices, serving as a reminder of the hard work and dedication that led to success.

The awards and recognition program at Rocket Drones is a testament to our commitment to fostering a supportive, competitive, and inspiring environment. It's not just about celebrating wins; it's about acknowledging effort, improvement, teamwork, and the pursuit of knowledge in the field of drone technology and STEM education. We encourage all participants to aim high, take on challenges, and seize the opportunities provided by our comprehensive awards and recognition system.





# 10. DRONE MAINTENANCE AND INSPECTION

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## Pre-Race Inspection

Prior to any Rocket Drones event, flight engineers and/or coaches are responsible for inspecting each competing Rocket Drones Race Drone's airworthiness and compliance with the specifications outlined in section below, "Drone Technical Specifications." This comprehensive pre-race inspection ensures that all drones meet safety and technical requirements, contributing to a fair and secure racing environment.

## Pre-Race Drone Inspection

Just before each race, it is the duty of individual Pilots and Flight Engineers to conduct a meticulous inspection of their assigned Racing Drones. This inspection is vital to confirm that the aircraft is in proper working order and complies with all technical specifications. Neglecting this step may result in delays during races or cause the pilot to be unable to complete their heat due to malfunctions or depleted battery. Failure to conduct this pre-race inspection may lead to a Did Not Finish (DNF) status for the race heat, emphasizing the importance of thorough aircraft verification.

## Approved Repair Parts

All Rocket Drones approved parts must be physically on the drone in order to compete in any event within the Rocket Drones Racing League. Repairs to the Rocket Drones Racing Drones may be done before, during and after events. Upon completion of repair during a racing session, the drone must be inspected by the school coach to ensure compliance before returning back to active racing status.

## Stage One Approved Part List

- ( 4 ) Rocket Drones BLDC 1102 18000KV Motors with (3) black motor screws per motor and c-clip shaft retainer per motor.
- ( 4 ) Rocket Drones CW / CCW 1635 (40mm) 3-blade 1.5mm shaft hole propellers.
- ( 1 ) Rocket Drones C02 FPV Micro Camera, mount with (2) capped silver retaining screws and silver camera vibration reduction plate.
- ( 1 ) Rocket Drones Flight Controller with (4) silicone vibration dampeners, foam vibration reduction block, LED Lightstrip wires, and FPV video antenna.
- ( 2 ) Rocket Drones LED light strips.  
LED lights may be inoperable during race but must still be physically attached to the frame during race events. LEDs being on or off offers no competitive advantage but removal of LED light strips would be considered weight shaving and not within compliance with Aircraft Modifications.
- ( 1 ) BT 2.0 Power Wire Pigtail with a length no shorter than 2.5" (63.5mm).
- ( 1 ) Rocket Drones Battery Tray / FC protector secured with (4) silver fastening screws.
- ( 1 ) Rocket Drones Stage One red racing frame.

## Stage Two Approved Part List

- ( 4 ) Rocket Drones BLDC 1102 18000KV Motors with (3) black motor screws per motor and c-clip shaft retainer per motor.
- ( 4 ) Rocket Drones CW / CCW 1635 (40mm) 3-blade 1.5mm shaft hole propellers.
- ( 1 ) Rocket Drones C02 FPV Micro Camera, mount with (2) capped silver retaining screws and silver camera vibration reduction plate.
- ( 1 ) Rocket Drones Flight Controller with (4) silicone vibration dampeners, foam vibration reduction block, LED Lightstrip wires, and FPV video antenna.
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- ( 1 ) BT 2.0 Power Wire Pigtail with a length no shorter than 2.5" (63.5mm).
- ( 1 ) Rocket Drones Battery Tray / FC protector secured with (4) silver fastening screws.
- ( 1 ) Rocket Drones Stage One red racing frame.



# 11. DRONE TECHNICAL SPECIFICATIONS

Rocket Drones Racing League is dedicated to ensuring the safety and fairness of our racing events. To achieve this, all racing drones must meet specific technical specifications. These specifications outline the type, size, and weight limits of racing drones, and they also mandate safety inspections and maintenance for all participants.



## Eligible Drone Models:

All participants are required to use a Rocket Drones Racing Drone. Rocket Drones offers two stages of kits. No other aircraft is permissible for Rocket Drones League events, including any drones not specifically provided by the school for home practice use.



## Stage One (Middle School / High School Beginners):

The Stage One Rocket Drones Racing Drone kit is designed for participants who are new to FPV drone racing. It provides a stable and manageable platform for beginners to develop their piloting skills. The kit includes a user-friendly flight controller, suitable for learners, and features that promote a more forgiving flight experience, allowing young pilots to build confidence while honing their abilities. Stage One specifications are included in the previous Stage I Approved Parts Lists.



## Stage Two (Middle School Advanced/High School):

The Stage Two Rocket Drones Racing Drone kit is tailored to advanced participants with more experience in FPV drone racing. It offers enhanced performance and agility, allowing skilled pilots to push their limits and engage in more competitive racing. With advanced components and fine-tuned configurations, the Stage Two kit offers an exciting and challenging experience for seasoned racers.

Stage Two specifications are included in the previous Stage II Approved Parts Lists.

**Safety Inspections and Maintenance:** It is imperative that all drones are well-maintained and undergo safety inspections before each race. To ensure the drones are in proper working condition and comply with the specifications outlined in this section, it is the responsibility of the team's coach or flight engineer to perform these safety checks.



## 11.1. Aircrat Modifications

Physical modifications to Rocket Drones Racing Drones are not permitted to enhance the performance of the drone. These include but are not limited to weight shaving by shortening wires, removing screws, removal of frame components, physical modifications of the flight controller or modification of the frame to reduce weight. These are all considered unsportsmanlike and can result in disqualification from the race or Rocket Drones Race League events and standings.

## 11.2. Technology Regulations

Rocket Drones Racing Drones are designed with various flight modes and speed profiles to provide flexibility and customization for participating pilots. These technology regulations ensure that all participants use the specified equipment and comply with Rocket Drones' firmware standards to maintain safety and fairness in the races.

## 11.3. Flight Modes and Speed Profiles

Rocket Drones Racing Drones feature three distinct flight modes: Normal, Sport, and Manual. Additionally, they offer three different speed profiles: Slow, Mid, and Fast. Pilots have the liberty to select their preferred flight and speed modes for any Rocket Drones Racing event. These modes can be adjusted using the SA and SC 3-position switches on the launch controller. Pilots may combine these modes to align with their racing strategies and abilities.

## 11.4. Firmware Restrictions

Only Rocket Drones' official firmware is permitted to be installed on the Flight Controller or Launch Controller. Rocket Drones will release firmware updates and important bulletins through its official website. Usage of firmware other than the official Rocket Drones firmware is strictly prohibited. Pilots or teams found using unauthorized firmware may face disqualification from the race.

# 12. COMMUNICATION AND NOTIFICATIONS

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Scheduled events are managed through our RocketDrones Race Portal. Communication between students and parents can be easily completed by utilizing our website.

## 12.1. Race Course

### 12.1.1. Track Design:

- **Design in Simulator:**

Start your track design process in a simulator to visualize and test the layout before physical implementation.

- **Safety Officer Involvement:**

Involve a Safety Officer in the design process to utilize risk management principles. They can ensure that the course design aligns with safety requirements and offer guidance on pilot and spectator seating as well as the launch table setup.

- **Gym Size Compatibility:**

Ensure that the track design is well-suited to the specific dimensions of your gym. Match the course layout to your available space for safe and effective races.

- **Adequate Clearances:**

Allow for sufficient clearances between racecourse elements and spectator seating to prevent interference and maintain safety.

- **Emergency Procedures:**

Include clear and well-communicated emergency procedures in your track design to address any unexpected situations, such as equipment malfunctions or pilot issues.

- **Consideration of Obstacles:**

Take into account any existing obstacles within the gym, such as pillars or structures, when designing the track layout to ensure safe and obstacle-free racing.

- **Adaptability:**

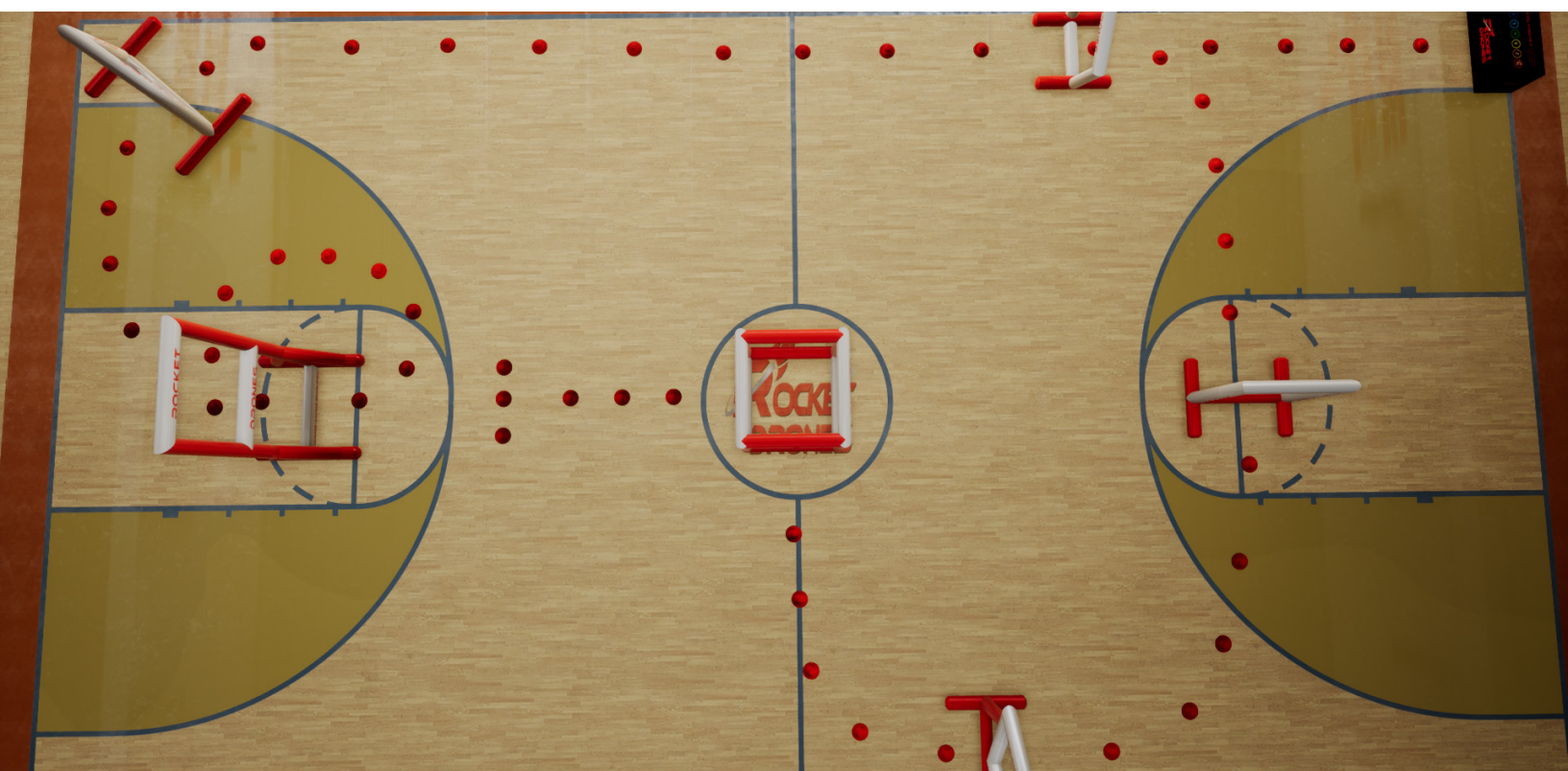
Design the track with flexibility in mind so that you can make adjustments or modifications if needed, depending on the number of participants and skill levels.

- **Visibility and Spectator Experience:**

Strive for an engaging and visible track design that allows spectators to enjoy the racing action and experience the excitement of FPV drone racing.

- **Course Markings:**

Clearly mark the track elements, gates, and obstacles to enhance the pilot's awareness of the course and enable smoother navigation. Utilize the included white cones to place indicators.



# 13. RACE INFORMATION AND EVENT OPERATION

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Scheduled events are managed through our RocketDrones Race Portal. Communication between students and parents can be easily completed by utilizing our website.

## 13.1. Time Trials and Inner Team Season Races



### Timing System :

To ensure precision in time trials and inner team season races, Rocket Drones has designed a timing system that integrates wirelessly through the included laptop. This system helps accurately record race times, making it a crucial component of the competitive experience. Time Trials and Inner Team Season Races are integral parts of Rocket Drones competitions. They allow pilots to demonstrate their skills and compete for rankings on the Rocket Drones Leaderboard. Here's a more detailed breakdown of how these races operate:



### Time Trials Tracks:

Rocket Drones has developed specific time trials tracks for the 2024 season, designed to suit different gym sizes. These tracks challenge pilots to navigate through a series of gates and obstacles as quickly as possible. The selection of the appropriate track depends on the available space.



### Leaderboard Ranking:

To gauge pilots' progress and performance, Team Coaches will make use of Rocket Drones Launch Portal, which integrates with the Rocket Drones Leaderboard Ranking System. This system tracks and ranks the performance of individual pilots, fostering competition and improvement.



### Timing System Failure:

In the rare event of a timing system failure during time trials, it's essential to address the situation promptly. When a timing system malfunction occurs, the heat must be restarted to ensure a fair and accurate competition.



### Resolution After Timing Failure:

In the event of a timing system failure, the Team Coach plays a crucial role. They can decide to review the heat using available DVR footage or choose to restart the heat to maintain fairness in the competition. This discretion ensures that unforeseen technical glitches don't unduly impact the outcome. We do have a manual timing tracking system highlighted later.



### Tie-Breaking:

In cases where the DVR results and Timing results yield a tie, the pilot who was timed via the official Timing system is declared the winner. This emphasis on official timing adds credibility to the results, resolving ties consistently.

## 13.2. Pre-Race Check



### Aircraft Readiness:

Before each race, participants bear the responsibility of ensuring that their aircraft is in optimal working condition. This includes a thorough check to confirm that all components are functioning correctly and that the drone complies with technical specifications.

## 13.3. During the Race



### Course Adherence:

Races are conducted according to predefined courses outlined by Rocket Drones. Pilots must navigate through the course, maneuvering their drones through gates, obstacles, and challenging routes. Adhering to the course layout adds an element of standardization to the races, ensuring a level playing field for all participants.

## 13.4. After the Race



### Post-Race Procedures:

After the conclusion of each race, participants should familiarize themselves with and follow the post-race procedures available on [www.RocketDrones.com](http://www.RocketDrones.com). These procedures may include actions such as data submission and debriefing.

## 13.5. Team vs. Team Scrimmages (Exempt from Leaderboards)



### Course Similarity:

Scrimmages are designed to replicate official racing courses to a significant extent. In these informal competitions, two participants from each team go head-to-head in races that help build teamwork and experience.



### Point-Based Scoring:

Scrimmages utilize a point-based scoring system. FPV Pilots race around the track in an attempt to successfully pass through each gate as many times as possible in two (2) minutes. One point is awarded for each completed lap. A missed gate results in no points for that lap until the missed gate is successfully completed. A bonus point is available for pilots who can land on their designated landing pad.

## 13.6. Simulator Races



### Setup Guidance:

Participants need to follow the setup instructions provided by [RocketDrones.com](http://RocketDrones.com). Proper setup and calibration are essential to replicate the experience of real races as closely as possible in the virtual environment.



### Troubleshooting Support:

In case of any technical issues or the need for troubleshooting, participants can refer to the dedicated troubleshooting guide available on [RocketDrones.com](http://RocketDrones.com). Additionally, they can reach out to support at [support@rocketdrones.com](mailto:support@rocketdrones.com) for timely assistance.

## 13.7. Event Planning



### Race Format Determination:

The choice between a double elimination format and a best two out of three format is made by RocketDrones.com for each specific event. These formats add variety to the competition and influence the strategies that pilots and teams employ.



### Web Interface Convenience:

Launch.RocketDrones.com provides a user-friendly web interface for event planning and registration. This interface is an invaluable resource for participants. It keeps them well-informed about event details, facilitates communication with organizers, and streamlines registration processes, ensuring that participants have a seamless experience.

# 14. RACE COURSE

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## 14.1. Track Design



### Design in Simulator:

Start your track design process in a simulator to visualize and test the layout before physical implementation.



### Safety Officer Involvement:

Involve a Safety Officer in the design process to utilize risk management principles. They can ensure that the course design aligns with safety requirements and offer guidance on pilot and spectator seating as well as the launch table setup.



### Gym Size Compatibility:

Ensure that the track design is well-suited to the specific dimensions of your gym. Match the course layout to your available space for safe and effective races.



### Adequate Clearances:

Allow for sufficient clearances between racecourse elements and spectator seating to prevent interference and maintain safety.



### Emergency Procedures:

Include clear and well-communicated emergency procedures in your track design to address any unexpected situations, such as equipment malfunctions or pilot issues.



### Consideration of Obstacles:

Take into account any existing obstacles within the gym, such as pillars or structures, when designing the track layout to ensure safe and obstacle-free racing.





### Adaptability:

Design the track with flexibility in mind so that you can make adjustments or modifications if needed, depending on the number of participants and skill levels.



### Visibility and Spectator Experience:

Strive for an engaging and visible track design that allows spectators to enjoy the racing action and experience the excitement of FPV drone racing.



### Course Markings:

Clearly mark the track elements, gates, and obstacles to enhance the pilot's awareness of the course and enable smoother navigation.



### Testing and Iteration:

Test the designed track in real-life conditions, and be prepared to make adjustments and iterate for optimal performance and safety.

## 14.2. Race Formats

### Time Trials

<b>Race Type</b>	Fastest 3 Consecutive Laps.
<b>Practice Rounds</b>	Optional and unlimited practice rounds (at Team Coach's discretion)
<b>Competition Heats</b>	Minimum of 5 and Maximum of 10 heats.
<b>Race Parameters</b>	Fastest 3 consecutive laps.
<b>Race Duration</b>	Fixed time-2 minutes (Last lap after the timer sounds counts if the pilot successfully completes the lap).
<b>Timing System</b>	Must use a Rocket Drones timing system.
<b>Race Start</b>	Race starts on the tone.
<b>Leaderboards</b>	All times must be submitted and added to Rocket Drones Leaderboards ranking system.

## Inter-School Season Competition

<b>Race Type</b>	Best 3 out of 5 rounds.
<b>Practice Rounds</b>	Optional and unlimited practice rounds (at Team Coach's discretion).Coach's discretion).
<b>Heat Grouping</b>	Pilots will be grouped into heats of four pilots, and each heat will run 5 rounds.
<b>Scoring</b>	Pilots receive 1 point for each successful lap within a 2-minute heat. 1 bonus point is available for landing on your designated table landing spot.
<b>Placement</b>	Best 3 out of 5 rounds are tallied to determine placement.
<b>Run-Offs</b>	In the event of a tie, runoff pilots will run a tie-breaker race to 3 laps to determine placement on the leaderboard.
<b>Race Duration</b>	Fixed time-2 minutes.
<b>Timing System</b>	Must use Rocket Drones timing software.
<b>Software</b>	Must use a Rocket Drones timing system.
<b>Software</b>	Race starts on the tone.
<b>Leaderboards</b>	All times must be submitted and added to Rocket Drones Leaderboards ranking system.

## School vs. School Scrimmages

<b>Team Composition</b>	2 members from each team per heat.
<b>Race Heats:</b>	2-minute race heats.
<b>Scoring</b>	1 point is awarded for each lap completed. 1 bonus point is available for landing on your designated table landing spot.
<b>Winner</b>	The team with the most points wins the race. Please visit <a href="http://www.rocketdrones.com/manualtracking">www.rocketdrones.com/manualtracking</a> to download a copy of our Manual Points Tracking for use with offline or downtime races.

## Simulator Races

<b>Race Type</b>	Handled inside the simulator.
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## 14.3. Race Strategies



### Turtle Mode:

Turtle Mode, sometimes called “Flip Over After Crash” (FOAC), is a valuable feature for drone racing. When a pilot crashes and ends up upside down, engaging Turtle Mode can flip the drone back over, allowing the pilot to continue racing without the need for manual recovery. Knowing when to use Turtle Mode effectively can save valuable seconds in a race.



### Pre-Turning:

Pre-turning involves anticipating the next element of the racecourse and initiating a turn slightly ahead of time. This strategy minimizes the need for abrupt, last-minute maneuvers and helps maintain a smoother and more efficient racing line. Pre-turning is essential for precision and speed.



### Gate Entry and Exit:

Gate entry and exit points are critical aspects of drone racing. Pilots must approach gates at the right angle and speed to ensure a smooth passage through them. A well-executed entry and exit from each gate is crucial for maintaining momentum and avoiding penalties.



### Enertia:

Enertia (a play on the words “energy” and “inertia”) refers to the conservation of kinetic energy during racing. Effective pilots focus on minimizing unnecessary braking or changes in direction to maintain speed. Conserving energy throughout the race can lead to improved lap times.



### Throttle Management:

Throttle management is all about controlling the drone’s speed and altitude. Skilled pilots adjust their throttle input to maintain a balance between speed, precision, and altitude. Proper throttle management ensures that the drone responds predictably to pilot commands.



### Maneuvers:

Maneuvers encompass a range of advanced flight techniques, including rolls, flips, power loops, and split S turns, which can be used strategically during a race. These maneuvers, when executed with precision, can help pilots navigate tight sections of the course or overtake competitors. However, it’s important to use them judiciously, as excessive maneuvering can lead to errors or crashes.

## 14.3. Race Strategies

Race marshaling is essential to maintaining fair competition and resolving issues during races. The following points outline the key responsibilities and procedures for race marshals:



### False Starts:

Any instances of false starts will be handled according to the rules set by RocketDrones. This rule ensures that races begin fairly, and any violations are appropriately addressed. A warning should be given for the first offense but subsequent false starts should result in a one (1) point deduction.



### Missed Gates:

Participants must ensure that they pass through all designated gates during the race. This requirement ensures that the race adheres to the designated course and adds an element of precision to the competition. Failure to do so may result in penalties. Pilots who fail to pass through each gate during each lap will result in no points earned for that lap.



### DQ (Disqualified):

Participants who fail to comply with the rules and regulations may face disqualification from the race. This rule emphasizes the importance of adhering to the established guidelines to ensure a fair and competitive environment.



### Restarts:

In certain situations, restarts may be allowed during a race. The decision to permit restarts is at the discretion of the race marshals, and the following factors may warrant a restart:

- Hazard or People on the Track (as per Team Coach discretion)
- Collapsed Obstacles
- Blastoff Rule (as per Team Coach discretion)
- False Start (as per Team Coach discretion)
- Timing System Error (as per Team Coach discretion)

It's important to note that once all pilots provide a "thumbs up" for good video and the arming sequence and race countdown begin, there will be no restarts during or following a race due to video issues. This ensures a streamlined race experience and maintains consistency during the competition.



### Updating Race Rankings:

Maintaining accurate and updated race rankings is crucial for tracking participant performance throughout the season. Here's how Rocket Drones handles this:



### Time Trials and Inner Season Races:

School champions from time trials and inner season races have the opportunity to compete in state rankings, regionals, and nationals. This progression system allows pilots to advance based on their skills and achievements.



### Course Validation:

To ensure the fairness and accuracy of races, all race courses must be validated according to the guidelines provided by RocketDrones.com. This process involves assessing and confirming that the course layout adheres to the specified standards.



### Importing Times and Leaderboards:

Times and leaderboards from races will be imported into the official RocketDrones Launch Portal for accurate rankings. This data integration streamlines the ranking process and ensures transparency.



### Seasonal Rankings:

Rocket Drones maintains seasonal rankings based on participants' performance throughout the season. These rankings serve as a valuable tool for tracking progress and recognizing top performers.

## 15. COMPETITION RULES

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### 15.1. National Qualifier Stage 1 & 2 Drones



#### Scheduling a Qualifier in the Dashboard:

To initiate a National Qualifier, teams should access their dashboard and select either Stage 1 or Stage 2 Qualifier. This marks the beginning of a personal time trial where participants aim to record their fastest three consecutive laps. Importantly, there are unlimited attempts allowed before the specified cutoff date, allowing teams and individuals to fine-tune their racing skills.



#### Course Verification Check:

Before the qualifier, it's essential to verify that the course layout aligns precisely with the specified configuration. This involves measuring and cross-checking the gate positions, ensuring they match the required course design. Course verification is crucial to maintain fairness and consistency among participants.



#### Uploading DVR Footage:

To complete the National Qualifier process, participants are required to upload DVR (Digital Video Recording) footage of their race runs. This footage should clearly show the three fastest consecutive laps. This verification step serves to ensure transparency and maintain the integrity of the qualifying process. It also provides a visual record of each racer's performance. The Coach's Guide offers guidance for uploading to the team's video page.

# 16. COMMUNITY ENGAGEMENT

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As a member of a Rocket Drones racing team, you have a unique opportunity to extend our passion for drone technology and racing to your own community. Community engagement is not just a concept we promote; it's something we encourage you to adopt within your team. Your active participation and outreach efforts can make a significant impact. Here's how you can get started:



## After-School Programs:

We encourage you to consider initiating after-school programs at your own school or within your local community. These programs can introduce fellow students to the thrilling world of drone racing. You can create a structured and supervised environment where students can learn the fundamentals of piloting drones, understand safety measures, and develop teamwork principles. By organizing after-school programs, you provide students with the foundation they need to excel in this exciting field.



## Summer Programs:

Organizing summer programs is another way to immerse your peers in the world of drone racing. These intensive programs offer hands-on experience and comprehensive training for budding drone pilots. Your leadership and the support of your team can create a fun and educational environment where students can explore the intricacies of racing, from piloting techniques to drone maintenance and technical specifications. Your commitment to guiding fellow students on a journey of skill development and friendly competition can make a significant impact.



## Community Events:

Hosting community events throughout the year is an excellent way to inspire and engage students within your community. By organizing open house sessions, drone expos, and racing demonstrations, you can share the thrill of drone racing up close. These events aim to ignite interest, encourage participation, and promote safety, innovation, and STEM education among students. Your involvement and enthusiasm can be contagious and inspire others to join in.



## School Outreach:

Reach out to your school or nearby schools to inspire students and educators about the limitless opportunities within the field of drone technology. You can provide engaging presentations, hands-on workshops, and interactive sessions that are tailor-made to pique students' interest. By showcasing the real-world applications of drones and sharing the excitement of racing, you can cultivate curiosity and passion for STEM subjects among students.



## Mentorship:

As an experienced student pilot and enthusiast, you can become a mentor to newcomers within your team. This mentorship can strengthen the sense of community and ensure that valuable skills and knowledge are passed down from one generation of student pilots to the next. By actively participating in mentorship programs, you contribute to the growth and success of your team and the broader community.

Your commitment to community engagement reflects your dedication to making drone racing an inclusive and exciting activity for students within your team. By actively adopting these programs and encouraging fellow students to get involved, you can extend the positive impact of drone racing, inspiring others to explore their passions, develop valuable skills, and achieve their full potential in the world of drone technology and racing. Join us in creating a thriving and supportive community of student pilots!

# 17. FEEDBACK AND IMPROVEMENT

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At Rocket Drones, we are committed to providing the best possible experience for our students and teachers. Your valuable feedback is a crucial component of this commitment, as it helps us identify areas for improvement and refine our products and services. We encourage open communication and invite you to be an active part of this process. Here's how you can contribute to our continuous improvement:

## Feedback Channels

We have established multiple channels for you to share your thoughts, suggestions, and concerns. Whether it's about the training materials, race operations, or any other aspect of our program, your feedback is highly appreciated. You can use the following channels to provide your input:



### Online Surveys:

Periodically, we conduct surveys to gather feedback from students and teachers. These surveys cover various aspects of our program and are designed to be easy to complete.



### Email:

Feel free to send us an email at [support@rocketdrones.com](mailto:support@rocketdrones.com) with your thoughts or suggestions. We value your input and will respond promptly.



### Direct Contact:

If you have a specific concern or a detailed suggestion, you can reach out to our team directly. Our contact information is available on the [RocketDrones.com](https://RocketDrones.com) website.

## Regular Feedback Sessions

We believe in the power of direct communication. To foster open dialogue, we periodically host feedback sessions with students and teachers. These sessions offer an opportunity to discuss your experiences, share your insights, and provide immediate feedback to our team. Your participation is highly encouraged, as it helps us understand your needs and preferences better.

## Feedback Implementation

Your feedback is not just collected and filed away. We take your input seriously and actively work to implement your suggestions whenever possible. Continuous improvement is at the core of our mission, and your insights are a driving force in shaping the future of our programs.

## Transparency

We are committed to being transparent about the changes and improvements made based on your feedback. When we implement significant updates or enhancements, you will be informed of the changes and how they address specific feedback received.

## Feedback Incentives

To express our gratitude for your input, we may offer incentives for participating in surveys or feedback sessions. These incentives can include special access, discounts, or recognition.

## Monitoring and Progress Reports

Periodically, we provide reports and updates on the progress made as a result of feedback received. This keeps you informed about the impact of your contributions and the positive changes they have brought to our programs.

## Future Collaboration

We view feedback as a collaborative effort to enhance your experience with Rocket Drones. Your insights not only guide our improvements but also foster a sense of partnership. Together, we can continue to refine and expand our offerings, making our programs even more rewarding for students and teachers.

We appreciate your commitment to excellence and are excited to embark on this journey of continuous improvement with you. Your feedback is invaluable, and we look forward to working together to create the best possible educational experiences for our students and teachers. Thank you for being an essential part of the Rocket Drones community!

