

# DRONES IN SCHOOL

## 2023-2024 Season Guide



**MULTIGP**<sup>®</sup>  
STEM ALLIANCE



[dronesinschool.com](https://dronesinschool.com)

Last Update: August 6, 2023

# What's It All About?

To participate in Drones in School you and your team will design, construct, and race a first-person view (FPV) drone.

## The Team

Teams involve two to six students. Each student fills one or more of the following roles; Project Manager, Manufacturing Engineer, Design Engineer, Drone Technician, Graphic Designer, and Marketing Coordinator. To participate in competitive events, teams must register with Drones in School annually. ([dronesinschool.com](http://dronesinschool.com)).

## The Process

### 1. Plan - Develop a Team Identity, Create a Plan and Find Sponsors

Prepare a plan, work-up a budget, and raise the needed capital through team sponsorship or other funding sources. Teams are encouraged to partner with business and industry for sponsorship funding.

### 2. Design - Design Your Drone

Using 3D Computer Aided Design (CAD) software, design your FPV drone to the specifications in the Guide for the current racing season.

### 3. Make - Build Your Prototype

Using traditional manufacturing processes, Computer Aided Manufacturing (CAM) software and/or 3D printing technology, the team will develop the best way to manufacture and assemble their drone.

### 4. Test - Test and Improve Your Drone Design

Put your drone through its paces and test all aspects. As you work through the engineering process you will need to make changes to the design. Make sure these are documented for your portfolio and shared through your Team Display.

### 5. Race - Compete with Your Team at an Event

Prepare your drone, marketing video, portfolio, and team display for the competition. Practice your piloting skills and see how you do in a competitive event.

# The Competition

## 1. Team Display

Each team will produce an informative display showing their work through all stages of the project. Think about your team identity, the design process, and the role each member has played on your team.

## 2. Technical Evaluation

Each drone is submitted for judges to evaluate compliance with the Season Guide specifications.

## 3. Engineering Judging

Judges review the team portfolio and team display to learn how the drones have been manufactured and why particular design features were chosen. Judges may also choose to interview teams to gain additional clarification, as needed.

## 4. Marketing Video

Each team will develop a video presentation that will be submitted prior to an event. This presentation will cover aspects of the challenge and should reflect the team's brand.

## 5. Portfolio Judging

Each team will create a portfolio documenting their project from beginning to end. The portfolio will be displayed in the Team Display.

## 6. Let's Race!

Teams compete with each other to see if they have a winning racing drone. Each sanctioned race will consist of a head-to-head and capture the flag event. Additionally, teams can participate in online virtual racing and simulator racing events.

# Rules and Regulations

## 1. The Challenge

1.1. Your team is tasked with designing, building, and racing the first person view (FPV) drone of the future.

1.2. In order to enter the championship, you must assign job roles to the members of your group. Ideally, one role should be allocated to each person. However, if you have fewer than six team members you will have to double up or share some roles and responsibilities. The following job roles should be covered by the members of your team:

- Project Manager (maximum 1 person)
  - This person oversees the project management of all key deliverables and ensures all equipment is ready for the competition. This includes organizing time, materials and equipment for completing all aspects of the project. The Project Manager will need to work

with all members to ensure tasks are progressing on time and offer assistance as needed. The Project Manager also serves as the main point of contact for the team advisor and Drones in School personnel at all events.

- Manufacturing Engineer
  - This person is responsible for advising team members on the manufacture of the drone and the constraints of the machining/manufacturing process. Manufacturing engineers will need to work with the design engineers to report and solve any problems with the construction of the drone and work with the drone technician to make repairs. The Manufacturing Engineer may also oversee the construction of the Team Display.
- Drone Technician
  - This role is responsible for ensuring all components of the drone are installed and working properly. Drone Technicians are responsible for using the configuration software to adjust the flight operation of the drone. Drone Technicians must also ensure that all team members are following the correct operating procedures and protocols for setting, modifying and operating the camera and/or radio frequencies during an event.
- Design Engineer
  - This role is responsible for the styling and the aerodynamic performance of the drone and design of the Team Display. Design engineers will need to work with the manufacturing engineer and drone technician to ensure these ideas can be realized, repaired and maintained.
- Graphic Designer
  - This person is responsible for producing the drone color scheme, team logo/identity, any special sponsorship logos, final graphic renderings and any additional team marketing materials. The graphic designer will need to work with all team members to coordinate the design and production of the team display, portfolio, team uniform and video presentation.
- Marketing Coordinator
  - The Marketing Coordinator is responsible for developing and managing the team brand strategy. This includes overseeing fundraising campaigns and managing sponsor-team relationships. The Marketing Coordinator works closely with other team members to ensure materials and presentations align with the team brand. The Marketing Coordinator also oversees production of the team's video presentation.

## 2. Levels

2.1. Teams are invited to participate in the following divisions, based on the current academic level of the most senior team member.

2.1.1. **UPDATED** Middle School - Students enrolled in a public, private or home-school offering instruction including grades six, seven and/or eight (All students on a middle school team must be 15 years old or younger on May 1st of the current season.) Students below grade six can also compete in the Middle School division.

2.1.2. **UPDATED** High School - Students enrolled in a public, private or home-school offering instruction between and including grades nine, ten, eleven and/or twelve. (All students on the team must be 19 years old or younger on May 1st of the current season.) Students below grade nine can also compete in the High School division.

### **3. Project Elements for All Drones in School Sanctioned Events**

#### 3.1.Drones

3.1.1.Each team must produce two (2) identical racing drones for all events.

3.1.2.A third drone may be produced as a DISPLAY ONLY drone. This drone must be identical to the other two drones and will be checked during the technical evaluation. This drone cannot be used during competition, but must stay in the team display once cleared in the technical evaluation.

#### 3.2.Portfolio

3.2.1.Each team must produce one (1) 'hard copy' portfolio (20 page maximum, excluding front and/or back covers) presented on "Letter" (8.5 x 11 inches), "Legal" (8.5 x 14 inches), or "Ledger/Tabloid" (11 x 17 inches) size paper for exhibit in the team display. This portfolio should detail the efforts of the team and include the design, engineering, marketing, manufacturing, and project management processes completed to date.

3.2.2.Portfolio and Team Display should showcase the following items:

3.2.2.1.Project management processes

3.2.2.2.Team roles, the division of work, and team member collaborations

3.2.2.3.Team identity

3.2.2.4.Marketing / Team Sponsorship / Promotion efforts

3.2.2.5.Design and Engineering process

3.2.2.6.Manufacturing process

3.2.2.7.Development, Testing, and Evaluation

3.2.3.Refer to the judging scorecard for portfolio specifications and content requirements.

#### 3.3. Team Display

3.3.1.Each team will be provided with a 120cm wide x 70cm deep x 150cm tall, dedicated exhibition tabletop style space for setting up the display.

3.3.2.Each Team Display space will have access to a single 110V outlet. Teams should provide their own surge protector if needing additional outlets.

3.3.3.Each Team Display must contain the following:

3.3.3.1.1 At least one assembled racing drone. If the team only submitted two drones for technical evaluation, this drone can be removed from the Team Display during the Capture the Flag portion of the competition, or if needed as a backup during the head-to-head race. The drone should be on exhibit in the Team Display at all other times. If the team submitted

three drones for technical evaluation, one drone will be designated as the "DISPLAY ONLY" drone and must remain in the team display at all times.

3.3.3.2. Team logo and an explanation of the process utilized to create the team name and logo.

3.3.3.3. Evidence of utilizing an engineering design process to develop the project.

3.3.3.4. Renderings and/or sketches of the drone design.

3.3.3.5. Full plans for the drone frame design with orthographic and isometric views.

3.3.3.6. Team members and the role they fulfilled in the project.

3.3.3.7. A printed copy of the Portfolio.

3.3.4. Refer to judging scorecard for Team Display scoring specifications.

3.3.5. All teams will be able to set up their Team Display upon arrival and prior to judging.

3.3.6. No part of the completed Team Display is allowed to protrude beyond the physical dimensions of the allocated exhibition space. This includes anything that might protrude above the highest point. e.g., Flags.

3.3.7. **ONLY** student team members are permitted to set-up their Team Display. There must be no supervising advisor/adult or other outside assistance unless deemed to be a health and safety issue.

#### 3.4. Marketing Video

3.4.1. Teams will be required to submit a marketing video to Drones in School related to their project.

3.4.2. **NEW** The video must not last longer than 4 minutes (6 minutes for the National and World Championship).

3.4.3. All marketing videos must be submitted to the Drones in School website prior to an event.

3.4.4. Event coordinators will review videos prior to their event and award points based on the judging scorecard.

## 4. The Registration Process

4.1. Registration is completed online at [www.dronesinschool.com](http://www.dronesinschool.com). Each school wanting to compete in the season must register before the last qualifying race in their region. Registration fees are per team.

Registration includes:

- Access to support from Drones in School and access to register for qualifying races during the season
- Drones in School Payload samples
- Access to special pricing on parts and accessories from authorized Drones in School partners

Each team will also need:

- 2 - Drones in School authorized motor sets
- 2 - Drones in School authorized flight controllers
- 2 - Radio Transmitters (one for each drone flight controller)
- 2 - FPV Transmitter Cameras
- 2 - FPV Goggles
- Batteries
- Battery Charger
- additional supplies deemed necessary by the team
- OPTIONAL - Velocidrone Software plus Micro Class Quads Premium Content add-on may be used for online "simulator only" race events.

4.2.Registration fees are non-refundable after 21 Days. All fees must be received before the date of your team's first competitive event.

## 5. Judging

5.1.Judging categories

5.1.1.There are six (6) main judging categories, each with specific judging activities.

- Specification Judging
- Design and Engineering Judging
- Portfolio and Team Display
- Marketing Video Judging
- Racing - Capture the Flag and Head-to-Head (Head-to-Head may include virtual races and/or face-to-face, live racing)

## 6. Drone Design Regulations

6.1.Each Drone may have a maximum of 4 motors. Motors must be official Drones in Schools authorized motors. (see [www.dronesinschool.com](http://www.dronesinschool.com) for the complete list)

6.2.The Transmitter and Receiver for all flight controllers must operate on the 2.4GHz frequency

6.3.All flight controllers must be authorized Drones in School flight controllers. (see [www.dronesinschool.com](http://www.dronesinschool.com) for the complete list)

6.4.Each Drone must be fitted with an FPV transmitter camera operating on the 5.8GHz frequency

6.4.1.**NEW** The FPV transmitter camera should be capable of 40 channels with a frequency range of approximately 5.658GHz to 5.917GHz (known as Race Band) or use HDZero channels.

6.4.2.The FPV transmitter camera should not be operated at greater than 25mW

6.5. **NEW** Each drone must be powered by a maximum of two LiPo batteries with a combined maximum voltage of 13.1V.

6.5.1. Only one battery may be used to power the flight controller and motors

6.5.2. Only one battery may be used to power the FPV transmitter camera

6.5.3. Drones can be designed to use a single battery to power the flight controller, motors, and FPV transmitter camera

6.6. The maximum dimensions shown below are to the furthest extremes in each direction and include propellers, antennas and any other part of the drone required for it to operate:

6.6.1. Length: 120mm

6.6.2. Width: 120mm

6.6.3. Height: 120mm

6.6.4. Propellers: 40mm Maximum (Must be completely surrounded by guards or ducts that prevent each propeller from making contact with a vertical surface when hovering level)

6.6.5. Motors: must be Drones in School authorized motors (see [www.dronesinschool.com](http://www.dronesinschool.com))

6.6.6. Weight: 80g Maximum (not including payload or batteries)

6.7. Payload

6.7.1. Each drone must carry one official Drones in School payload during the Head-to-Head and Capture the Flag portions of the event.

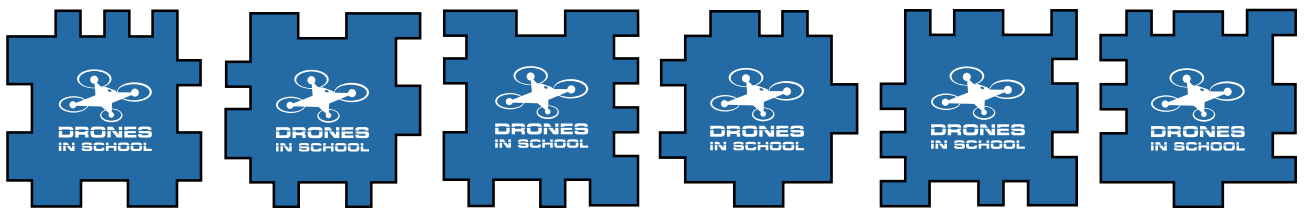
6.7.2. The payload may not be glued or permanently fastened to the drone. It must be removed and presented to the Drones in School official at the end of each flight.

6.7.3. On the signal of the Drones in School official, each team will have 30 seconds to provide their payload to the official by placing it in the official's hand or a spot designated by the official.

6.7.4. Loss of the payload during a Head-to-Head or Capture the Flag match or failure to produce the entire payload for the race official within 30 seconds from the end of a flight will result in the team losing that match.

6.7.5. **NEW** 2023-24 Payload description

6.7.5.1. Each drone must carry one of six foam puzzle pieces that are each 40mm x 40mm x 5mm thick. (see images below)



6.7.5.2. Each registered team will receive a full set of six puzzle pieces.

6.7.5.3. Drones should be designed to carry any one of the six possible pieces.



6.8.Only one drone design may be used by a team at any given event and must be used for any and all event activities.

6.8.1.It is expected that damage will be sustained throughout the course of an event, so any parts including frames, propellers, motors, flight controllers, FPV transmitter camera, etc. may be changed or replaced. However, these must be identical to those with which the drone passed inspection during the Technical Evaluation.

6.8.2.Adding or removing of any subsystems or attachments for different types of activities is not permitted.

6.9.Drone Construction

6.9.1. High School Division: The flight controller, motor, and payload must be the ones authorized from Drones in School. The flight controller, propellers, battery, FPV transmitter, and camera may be purchased from any vendor/source. All other components of the drone must be designed and manufactured by the students on the respective team.

6.9.2. Middle School Division: The flight controller, motor, and payload must be the ones authorized from Drones in School. The flight controller, propellers, battery, FPV transmitter, camera, **and frame** may be purchased from any vendor/source. All other components of the drone must be designed and manufactured by the students on the respective team. (ie. attachment for carrying payload)

6.10.All Drones must be able to be disarmed via a single switch on the transmitter. This switch must be clearly identified with red heat-shrink tubing or red PVC tape tightly wrapped to the switch actuator.

6.11.Drones must be fitted with a failsafe (arm switch) that cuts power to all motors in the event of loss of signal between the transmitter and the drone.

## 7. General Rules

7.1.Each team must have two people present in the Pilots Box during their match or race.

7.1.1.One team member will be the Remote Pilot in Command (RPIC) and must sit in the Pilot's Seat while the match or race is in progress.

7.1.2.The other team member will be the Visual Observer (VO) and must stay in the VO's Station by the Pilot for whom they are spotting.

7.2.The pilot may only control their drone from an FPV perspective using appropriate FPV Goggles during all head-to-head races.

7.2.1.Pilots are not permitted to control their Drone from a line of sight (LOS) perspective during head-to-head racing.

7.2.2.Pilots must not remove their FPV Goggles during a head-to-head race. Removal of FPV Goggles may result in a Warning or Disqualification.

7.3.During capture the flag matches, Pilots must use line of sight perspective (LOS) to control their drone.

7.4.After the race or match begins, the transmitter may only be touched by the Pilot.

- 7.5. Prior to the match starting, each drone must be placed on the designated starting pad by either team member (Pilot or Visual Observer).
- 7.5.1. Drones must be disarmed when they are being placed and must remain disarmed until an event official states that it is safe to arm.
- 7.5.2. Any drones that are armed prior to an event official stating that it is safe to arm may be disqualified from the match.
- 7.6. Drones in Schools officials can request any or all drones be disarmed at any point during the match or race.
- 7.6.1. Drones in Schools event organizers and officials reserve the right to intervene and disarm any drone(s) at any time and for any reason.
- 7.7. No additional team members are permitted to enter the Flight Zone at any point during a match.
- 7.8. While it is expected that there may be contact between drones during a match or race, intentionally crashing into opponents will result in a warning or disqualification.
- 7.9. **NEW** During all races, the Visual Observer and Remote Pilot in Command should follow the Flight Procedures provided on [www.dronesinschool.com](http://www.dronesinschool.com).
- 7.10. **NEW** For live race events, each team must name their drone to match their team name. (Example: Team High Five-1, Team High Five-2) Drone name must be configured to display on the on-screen display when the drone is disarmed.

## 8. Competing Teams

- 8.1. Each team must consist of a minimum of 2 students to a maximum of 6.
- 8.2. Only members of the official competing team (maximum 6) are permitted to wear the team's uniform.
- 8.3. During the competition, only the official team members (maximum of 6) can represent the team at registration, Team Display set up, Technical Evaluation, Marketing Video Presentation, Design & Engineering judging, racing, and any direct communication with Drones in Schools event organizers and officials.

## 9. Team Responsibilities

- 9.1. Teams must read the Drones in Schools Season Guide (this document) carefully to ensure their drones and all project elements satisfy these regulations and they understand the requirements/procedures for all aspects of the competition and judging.
- 9.2. During the competition, it is the team's responsibility to ensure that team members are present at the correct time and location for all scheduled activities.
- 9.3. Security of the Team Display and its elements is the team's responsibility during competition.

## 10. Role and Responsibility of the Team Advisor

- 10.1. All team advisors should carefully read and understand the conditions for entry to a Drones in School event and must have explained all relevant information to their team members.
- 10.2. It is the primary responsibility of any team advisor to ensure duty of care/well-being for all their student team members. Any concerns arising during the event in relation to this should be brought to the attention of Drones in Schools event organizers and/or officials immediately.
- 10.3. The team advisor is permitted to be present during any judging activity with their team but must not interact in any way with the student team, judges, or judging process. Any incident considered inappropriate should be brought to the attention of Drones in School event organizers and/or officials, and penalty points may be applied.

## 11. Regulations Documents

- 11.1. Drones in School issues the regulations, revisions and any amendments through the Drones in School Season Guide.
- 11.2. Drones in Schools Season Guide (this document).
  - 11.2.1. Text clarification - any frequently asked questions that are deemed by Drones in School to be related to text needing clarification will be answered. The question and the clarification will be published to all teams at the same time through the Drones in Schools website ([www.dronesinschool.com](http://www.dronesinschool.com))
  - 11.2.2. Other supplementary competition regulations or documents may be issued by Drones in School that provide groups with further logistic and additional important event information. Any supplementary regulations will be issued to each team advisor and the Team Project Manager, where the Team Project Manager has supplied Drones in School with a contact email address.

## 12. Safety Rules

- 12.1. If at any time a drone or the actions of the team responsible for that drone are deemed to be unsafe or behaving in an unsafe manner, the offending team's drone may be disarmed by the event officials and the team may be disqualified from the match or race. Serious breaches of safety may result in disqualification from the event,
- 12.2. Any team member entering the Flight Zone at any time must wear suitable eye protection
- 12.3. Lithium Polymer batteries may only be charged when all the following criteria are satisfied:
  - 12.3.1. Charging takes place in the designated Charging Zone(s) which will be defined by the Drones in Schools event organizers at check-in.
  - 12.3.2. Failure to comply with this rule may result in disqualification from the event.
- 12.4. Drones may only be connected to a battery when in a designated Flight Zone.

12.5.The FPV transmitter camera may only be powered up when your team is about to participate in a match or race - powering an FPV transmitter camera at any other time may result in interference for another team currently competing in a match or race and may result in disqualification from the event.

### **13. Capture the Flag Rules**

13.1.Capture the Flag is played by two teams that consist of two drones each. One team will be designated as the Red Team, and the other will be the Blue Team. Drones must work together to capture more flags than the opposition.

13.2.The game is played on a field no larger than 12 meters by 6 meters. The field is divided into two halves, one Red and one Blue. Each half contains five flags which start the match set to the opposite color as the half they are in.

13.3.Teams must "capture" the flags that are owned by the opposing team by changing their color. When a drone hovers over a flag, it will change color, alternating between red and blue. Teams can receive bonus points by being landed on one of their starting pads before the match ends.

13.4.The winner is the team with the most points at the end of the match.

13.5.The Capture the Flag competition may be a round-robin or double elimination tournament.

13.6.At the beginning of the match, each drone must be placed so that it is only contacting a starting pad and so that no part of the drone is touching the surrounding floor.

13.6.1.Only one drone may occupy each starting pad.

13.6.2.Drones can begin and end on either starting pad.

13.7.Pilots must not take off until directed to do so by the Drones in School official. False starts may result in disqualification from the match.

13.8.Scores are calculated as soon as the timer signals the end of the match. Any flags captured or landings completed after the end of the match will not be scored.

13.9.Pilots are not permitted to land on the opposing team's starting pad. Minor violations will result in a warning, but match affecting violations may result in disqualification from the match.

13.10. Any flags that are damaged during a match so they do not display a color will not be counted towards the score of either team.

13.11.A drone is considered landed if:

13.11.1.It is contacting a Landing Pad of the same color as it's team

13.11.2.No part of the Drone is touching the surrounding floor

13.11.3.Rules 12.12.1 and 12.12.2 remain satisfied when the drone is disarmed

## 14. Capture the Flag Match Scoring

- 14.1. Each flag is worth 5 points
- 14.2. A landed drone is worth 10 points

## 15. Capture the Flag Final Scoring

- 15.1. Capture the Flag Winner (1st) = 40 points
- 15.2. Eliminated in Final (2nd) = 30 points
- 15.3. Eliminated in Semi Final (3rd & 4th) = 20 points
- 15.4. Eliminated in Quarter Final (5th & 6th) = 15 points
- 15.5. Eliminated before Quarter Final ( $\geq 7$ th place) = 10 points
- 15.6. Unable to fly, forfeit or disqualification = 0 points

## 16. Head-to-Head Rules

- 16.1. **NEW** Head-to-Head is a double elimination race around a race course which is marked out by a series of gates. Two pilots, one from each team, will race together on a single course. The winner is the pilot who completes the most laps in the allotted time or the first to a number of laps. (three to five laps, designated by host location)
- 16.2. Race courses may vary in size and layout depending on the venue and the amount of space available.
- 16.3. Gates used may vary based on the venue but will have a minimum opening of 3600 cm<sup>2</sup>.
- 16.4. At the beginning of each match, each drone must be placed so that it is only contacting a starting pad and no part of the drone is touching the surrounding floor
- 16.5. Pilots must not take off until directed to do so by the Drones in School official. False starts may result in disqualification from the race.
- 16.6. Pilots must navigate through the gates in the correct order and in the correct direction. If an Event Official is not satisfied that the course has been successfully completed, the lap may be voided.
- 16.7. If a pilot misses a gate or obstacle, they must turn the aircraft around to correctly navigate the course.
- 16.8. The Event Official may elect to run the head-to-head race in a round-robin or double elimination tournament.

## **17. Head-to-Head Scoring**

- 17.1. Eliminated before Quarter Final = 10 points
- 17.2. Eliminated in Quarter Final (5th & 6th)= 15 points
- 17.3. Eliminated in Semi Final (3rd & 4th) = 20 points
- 17.4. Eliminated in Final (2nd) = 30 points
- 17.5. Head-to-Head Winner (1st) = 40 points
- 17.6. Unable to fly, forfeit or disqualification = 0 points

## **18. Awards**

- 18.1. Each Drones in School event will include the following awards
  - 18.1.1. Overall Event Champion
  - 18.1.2. Design and Engineering Champion
  - 18.1.3. Portfolio and Team Display Champion
  - 18.1.4. Marketing Video Champion
  - 18.1.5. Capture the Flag Champion
  - 18.1.6. Head-to-Head Champion
- 18.2. Optional Awards
  - 18.2.1. Fastest Head-to-Head Lap
  - 18.2.2. Judges Choice

## **19. Season Guide Updates**

- 19.1. Although great care and effort has gone into the preparation of this document, Drones in School reserves the right to update the document as needed throughout the competition season.
- 19.2. Any update will be posted to the Drones in School website with a "last updated" date included on the cover for each version of the document.

## **Appendix: Judges Sheets**

Team Number: \_\_\_\_\_ Team Name: \_\_\_\_\_  
 School: \_\_\_\_\_

## Portfolio & Display

### PORTFOLIO

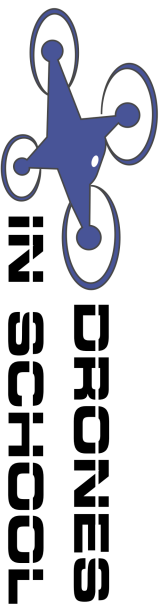
<b>Project Management</b>	Little evidence of project management presented. 1 2 3 4 5	Simple management and planning used to guide progress. A range of resources considered. 6 7 8 9 10	Comprehensive project management. A wide range of factors considered; e.g., scope, time, resources and project risks. 11 12 13 14 15
<b>Team Work</b>	Limited team work evident. 1 2 3 4 5	Evidence of effective team work and roles defined 6 7 8 9 10	Highly structured team with clear roles. All team members had effective and critical contributions. Role collaboration recognized 11 12 13 14 15
<b>Portfolio Clarity &amp; Quality</b>	Difficult to follow with basic presentation. 1 2 3 4 5	Clear structure, well organized. Good use of graphics, charts and tables to enhance presentation and impact. 6 7 8 9 10	High impact and professional throughout. Consistent and clear. Excellent use of graphics, charts and tables to enhance portfolio 11 12 13 14 15
<b>Portfolio Total</b> /45			

### PIT DISPLAY & MARKETING

<b>Team Identity</b>	Inconsistent, limited or obscure identity 1 2 3 4 5	Effective team identity consistent through various project components. 6 7 8 9 10	Excellent and highly effective team identity. Consistently applied through all project elements. 11 12 13 14 15
<b>Marketing</b>	Limited or irrelevant 1 2 3 4 5	Some marketing activity / sponsorship explained 6 7 8 9 10	Creative and effective activities linked to sponsorship & ROI 11 12 13 14 15
<b>Display Booth</b>	Repetition of portfolio elements 1 2 3 4 5	Clear and effective presentation and messaging. Some project development displayed. 6 7 8 9 10	Clean, well organized and has high impact. Highly professional with attention to detail. Well presented project development. 11 12 13 14 15
<b>Pit Display &amp; Marketing Total</b> /45			

### DESIGN PROCESS

<b>Ideas</b>	Single or basic concepts 1 2 3 4 5	Multiple concepts with links to research. 6 7 8 9 10	Several technically inspired ideas. Clearly considered many options. 11 12 13 14 15
<b>Development and Testing</b>	Limited development shown 1 2 3 4 5	Logical design developments based on testing 6 7 8 9 10	Clear and justified developments linked to tests and research 11 12 13 14 15
<b>Manufacture</b>	Little manufacturing detail 1 2 3 4 5	Manufacturing processes and issues presented 6 7 8 9 10	Detailed assessment of manufacture, stages, materials & issues 11 12 13 14 15
<b>Design Process Total</b> /45			



**Portfolio Total + Pit Display & Marketing Total + Design Process = Portfolio and Display Total =**

/135

Judge's Notes / Comments:

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Team Number: \_\_\_\_\_

Team Name: \_\_\_\_\_

School: \_\_\_\_\_

## Design & Engineering

### COMPUTER AIDED DESIGN AND ANALYSIS

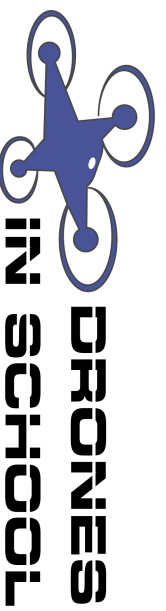
Application of CAD-CAM	Basic application. Final design in CAD only	Appropriate use of CAD in product development stages. Good understanding of CAM evident	Advanced use of CAD and CAM technologies throughout. Final CAD identical to the physical model produced
<b>Analysis</b>	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
	Minimal analysis shown	Good analysis. Results applied to development	Variety of advanced and relevant analysis techniques conducted
<b>Organization</b>	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
	Generally unorganised	Satisfactory organization of data and models	Data & parts highly ordered & labeled. Full CAD product assembly
<b>Orthographic &amp; Rendering</b>	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
	Basic drawing & rendering	Good technical drawing and realistic rendering	High detail & includes spec dimensions. Photorealistic rendering
<b>CAD &amp; Analysis Total</b>			
<b>/60</b>			

### MANUFACTURING

Quality	Reasonable quality with inconsistencies	Good overall quality with attention to detail	Showcase ' finish quality on all components. Exceptional attention to detail. Drones are identical.
<b>Assembly</b>	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
	Poorly assembled	Generally well assembled and engineered	Professional assembly, highly engineered. Sound techniques
<b>Manufacturing Total</b>			
<b>/30</b>			

**CAD & Analysis Total + Manufacturing Total = Engineering Judging Total =**

**/90**



Judge's Notes / Comments:

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Team Number: \_\_\_\_\_ Team Name: \_\_\_\_\_  
 School: \_\_\_\_\_

## Marketing Video

### TECHNIQUE

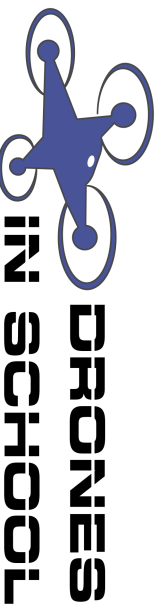
<b>Creativity</b>	The video is not creative. More like a school presentation than a marketing video.	Some creativity evident, but the video is not original.	The video is creative, original, and memorable.
	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
<b>Storytelling</b>	Does not follow a logical sequence. Little to no planning involved.	Shows some evidence of planning and storyboarding. Sequence somewhat logical.	The video tells a compelling story that engages the viewer.
	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
<b>Production</b>	Video is not well planned and has poor edits. Sound is of poor quality. Many sound & visual elements distract from message.	Video was somewhat planned. Transitions and edits are rudimentary. Some sound and visual elements are distracting.	Video is well planned with smooth transitions and edits. Sound is expertly balanced and easy to hear. Visual elements included.
	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
<b>Technique Total</b>			
<b>/45</b>			

### COMPOSITION

<b>Purpose</b>	The video does not include a purpose for the marketing campaign.	The video suggests a purpose for the marketing campaign, but is not clearly communicated.	The video clearly and concisely communicates the purpose of the marketing campaign.
	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
<b>Use of Time</b>	Little balance of time for the topics covered.	Good timing. Balanced depth and pace.	Excellent balance of depth for each topic with appropriate timing.
	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
<b>Call to Action</b>	The video does not include much reference to a call to action.	The video alludes a clear call to action, but is unclear about what to do next.	The video includes a clear call to action that tells the viewer what to do next.
	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
<b>Composition Total</b>			
<b>/45</b>			

### OVERALL IMPACT

<b>Collaboration</b>	Video does not explain why team members are important.	Explains the teams importance but details are not complete.	The video expertly makes the case for the entire team and the role each person played in the teams' development.
	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
<b>Branding</b>	The video does not include clear connections to the team's identity and values.	The video somewhat reflects the team's identity and values.	The video accurately reflects the team's identity and values.
	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
<b>Engagement</b>	Presentation is unclear and the video is unmemorable.	Viewer mostly understands and might remember the video. Some introduced themes/topics may distract from message.	The video keeps the viewer engaged and interested from beginning to end.
	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
<b>Subject Matter Total</b>			
<b>/45</b>			



**Technique Total + Composition Total + Overall Impact Total = Video Presentation Total =**

**/135**

Judge's Notes / Comments:

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