DRONE CHALLENGE (UAV)

OVERVIEW

Applying leadership and 21st century skills, participants will demonstrate their knowledge of drones by participating in manual flight missions related to a specific theme area. Teams will also study the principles of flight and research the use of drones in a specified theme area to create a documentation portfolio. Semifinalists will participate in an on-site interview.

The annual theme will be posted on the TSA website under *Themes & Problems*.

ELIGIBILITY

Three (3) teams of two (2) individuals per state may participate.

TIME LIMITS

A. Ten (10) minutes prior to assigned times teams can set up their assigned pit area.
B. Thirty (30) minutes session to test and correct any problems. During this time judges will also perform a safety check.
C. Ten (10) minutes running clock to complete the challenge.
D. Ten (10) minutes for the semifinalist interview.

ATTIRE

TSA competition attire, safety glasses, and safety vests are required for this event.

PROCEDURE

PRE-CONFERENCE

A. Participants review the TSA Honor Statement for Competitive Events found in the General Rules and listed in the individual competitive event rules.
B. Participants access the annual theme on the TSA website under *Themes & Problems*.
C. Participants complete their documentation portfolio and test their UAV drone.

PRELIMINARY ROUND

A. While wearing safety glasses and safety vests, participants will submit their drone, submit documentation portfolios, and sign up for a setup and testing time at the time and place stated in the conference program.
B. While wearing safety glasses and safety vests, participants attend a fifteen (15)-minute orientation meeting at the time and place stated in the conference program.
C. Students will arrive at the assigned place and time to:
    1. Set up their pit areas
    2. Set up their drone
D. Entries are reviewed by judges to determine safety.
E. Safe drones will be given opportunity to test.
F. Top sixteen (16) scores on drone testing will have their documentation portfolios evaluated.
G. A list of twelve (12) semifinalists (in random order) is posted.

SEMINFINAL ROUND

A. Participants report at the time and place stated in the conference program to sign up for an interview time.
B. Participants report at the assigned time and place for the ten (10) minutes interview.
C. Portfolio, challenge, and interviews scores are combined with race points to determine the final standings.
D. The top ten (10) finalists are announced at the awards ceremony.

REGULATIONS AND REQUIREMENTS

Students will work to develop their leadership and 21st century skills in the process of preparing for and participating in this TSA competitive event. The development and application of those skills must be evident in their submission, demonstration, and/or communication pertaining to the entry.

PRELIMINARY ROUND

A. Participants must check for the current year's design challenge specifications on the TSA website under *Themes & Problems*.

B. Documentation Portfolio:
   1. Documentation portfolio is required and must be secured in a clear front report cover with the following single-sided, 8½" x 11" pages, in this order:
      a. Title page with the event title, the conference city and state, the year; and the team identification number; one (1) page
      b. Table of Contents; one (1) page
      c. Explanation of the problem(s); one (1) page
      d. Communication of solution(s) - illustrating and explaining up to three (3) ways drones may be used related to the given theme; maximum three (3) pages
      e. Resources/Bibliography; pages as needed
      f. Work Log (see 2026 & 2027 Forms Appendix); pages as needed

UAV Drone Specifications

A. Drones can be purchased commercially or built by the team members. Drones can be RC controlled or Wi-Fi.
B. With all components attached, drone must not exceed the following dimensions:
   1. 9" width (at the furthest point)
   2. 9" length (at the furthest point)
   3. 5" height (as measured from the surface the drone is resting upon to the highest point of the drone with all its components attached)
C. Drone weight (with all components attached) must not exceed 3.5oz (100g).
D. Propeller guards/cage may be used if, once attached, the overall drone size does not exceed the dimensions listed above.
E. A gamepad controller or smartphone/tablet may be used for manual flight.
F. First Person View (FPV) Goggles are not allowed.
G. If using Wi-Fi, teams must change their drone Wi-Fi name (e.g. TELLO-A9BBB3) to their official TSA Team or Chapter ID number (e.g. T9999).

Manual Flight Overview

A. Participants must wear safety glasses and safety vests at all time during the event (including check-in, submission, and orientation meeting).
B. Participants choose which missions to complete manually to score the most points.
C. Various points will be assigned for each mission accomplished.
D. Missions do not need to be navigated in any specific order.
E. The manual flight attempt lasts one (1) minute and the timer never pauses.
F. Participants will be given up to three (3) attempts to achieve their best score by completing the flight missions.
G. Each member of the team must complete at least one (1) attempt as the pilot.
H. The lowers scoring flight attempt will be dropped. The top two (2) manual flight attempts will be added together to determine the total flight score.

DURING THE COMPETITION

A. Participants must wear safety glasses and safety vests at all times during the event.
B. At the hot table, participants power up their drone and connect to their Drone Control System.
C. Only one (1) team at a time competes within the airspace.
D. The spotter places the drone on the launch pad. An attempt begins with a countdown.
E. The pilot and spotter must remain outside the airspace and controls the drone from outside the perimeter (protective netting).
F. Participants will have one (1) minute to complete the flight missions manually. The time never pauses.
G. Participants will be given up to three (3) attempts to achieve their best score. Each member of the team must complete at least one (1) attempt as the pilot. The lowest scoring flight attempt will be dropped.

Drone Flight Rules

A. The manual flight attempt specifications are as follows:

1. Only one (1) team will be allowed in the competition area.
2. A hot table will be set up for teams to power up the drone and connect to the Drone Control System.
    a. One a team that is next to fly should be at the hot table.
    b. Teams may have spare parts (e.g., propellers, batteries) available, but must supply their own parts.
3. During an attempt, one (1) team member will serve as the pilot and one (1) team member will serve as the spotter.
4. At flight time, the drone will be placed on the launch pad inside the protective netting and then both members must be outside of the protective netting prior to the start and/or power to the propellers.
    a. Power cannot be applied to the propellers until the attempt begins.
    b. The attempt will begin with a countdown ("3, 2, 1, GO") by the timekeeper. At that time, the drone must take off.
    c. The drone must be in contact with the launch pad when the word "go" is announced. Takeoff before the official start will result in a score of 0 for the attempt.
5. During the attempt, the following applies:
    a. If the drone unintentionally stops during the attempt and no power is applied to the drone propellers, the spotter may enter the airspace, pick up the drone, and move it to the launch pad to continue the attempt.
    b. If a part of the drone becomes detached during the attempt, it may be retrieved after the attempt is scored and there is not penalty. If the spotter retrieves the detached part during the attempt, a 20% rules violation will be applied in Tier 1.
    c. The spotter may not touch any part of the missions. A violation of this rule will result in a score of 0 for the attempt.
6. Missions do not need to be navigated in any specific order. Points are awarded based on successfully completing individual missions.
7. Missions may be attempted multiple times, but only the highest-scoring, single attempt will be recorded.
8. Participants will not be penalized for accidental contact with mission and/or airspace elements.
9. Intentional damage to missions will result in a score of 0 for the attempt.
10. Participants will be asked to crash land or ground their drone if it poses a threat to any individuals or contacts the protective netting excessively.
11. At the end of the attempt, everything must be preserved as-is.
    a. If the drone is moving, it must be landed, and the propellers powered down.
    b. The drone musts be left in place.
    c. Missions completed after the end of the attempt will not be scored.
12. The judge will discuss what happened with the participants, mission by mission.
    a. If the participants agree with the score sheet, the participants initials the score sheet and the score is final.
    b. Any challenges must be made at this time by one of the participating team members to the coordinator or lead judge.
    c. The coordinator or lead judge will make the final decision.
13. The team will be given three attempts. Each member of the team must serve as the pilot on at least one (1) of the attempts. The lowest scoring flight attempt will be dropped. The two (2) highest scoring flight attempts will be added together for the manual flight score.
14. Only competing participants and event officials may be in the event area.

15. Judges may inspect the drone at any time before, during, or after an attempt.
16. Any additional rules, regulations, or guidelines established by the event coordinator must be followed.

Drone Safety

A. Power cannot be applied to the propellers unless the drone is within the airspace.
B. Participants may not fly in an intentionally dangerous manner.
C. Participants must not fly their drones over or near other individuals.
D. Participants mat only fly their drone when instructed to do so by a judge.
E. Participants will be asked to emergency stop or crash their drone if its flight course poses a threat to any individuals.
F. The Drone Control System must remain untouched while a participant is placing the drone on the launch pad.
G. Participants will adhere to all safety rules and directions of event officials.

Battery Safety

A. Participants may only connect a battery to the drone when the drone is on the hot table and told to do so by an official.
B. Participants should always be present during the charging or a lithium polymer (liPo) battery.
C. Never charge a batter that is puffy or punctured.
D. Stop charging immediately if a battery heats up.

EVALUATION

PRELIMINARY ROUND

Tier 1

A. Drone testing

Tier 2

B. Documentation portfolio

SEMINFINAL ROUND

A. The interview

Refer to the official rating form for more information.

TSA HONOR STATEMENT

All work must be created and completed by individual competitors or teams. Plagiarism, the use of Generative Artificial Intelligence (GenAI) software, copyright violation, cheating, and falsification of information are prohibited. Participants may NOT use any generative artificial intelligence (GenAI) tools (e.g. ChatGPT, Google Gemini, GitHub Copilot, etc.). Any attempt to gain an unfair advantage will not be tolerated. Competitors at any level of TSA competition understand and agree to abide by the TSA Honor Statement.

If it is determined that a student violated the TSA Honor Statement, a rules violation of twenty percent (20%) will be incurred.

STEM INTEGRATION

This event aligns with the STEM (Science, Technology, Engineering, and Mathematics) educational standards.

LEADERSHIP AND 21ST CENTURY SKILLS

This event provides opportunity for students to build and develop leadership and 21st century skills including but not limited to – Communication, Collaboration/Social Skills, Initiative, Problem Solving/Risk Taking, Critical Thinking, Perseverance/Grit, Creativity, Relationship Building/Teamwork, Dependability/Integrity, and Flexibility/Adaptability

Participant/Team ID# _____

DRONE CHALLENGE (UAV)

2026 & 2027 OFFICIAL RATING FORM

MIDDLE SCHOOL

Judges: Using minimal (1-4 points), adequate (5-8 points), or exemplary (9-10 points) performance levels as a guideline in the rating form, record the scores earned for the event criteria in the column spaces to the right. The X1 or X2 notation in the criteria column is a multiplier factor for determining the points earned. (Example: an "adequate" score of 7 for an X1 criterion = 7 points; an "adequate" score of 7 for an X2 criterion = 14 points.) A score of zero (0) is acceptable if the minimal performance for any criterion is not met.

Go/No Go Specifications

- Before judging the entry, ensure that the items below are present; indicate presence with a check mark in the box.
- If an item is missing, leave the box next to the item blank and place a check mark in the box labeled ENTRY NOT EVALUATED.
- If a check mark is placed in the ENTRY NOT EVALUATED box, the entry is not to be judged.

☐ TIER 1 – Drone, safety vests, and safety glasses
☐ TIER 2 – Documentation Portfolio
☐ ENTRY NOT EVALUATED

TIER 1 – MANUAL DRONE FLIGHT (60 points)	
Evaluation: Each team has three attempts. Drop the lowest score (do not record) and enter the two (2) highest scores.	
Highest Attempt Score (60 points)	
Second Highest Attempt Score (60 points)	
TIER 1 – MANUAL DRONE FLIGHT SUBTOTAL (120 points)	

Rules violations (a deduction of 20% of the total possible points for the above sections) must be initialed by the judge, coordinator, and manager of the event. Record the deduction in the space to the right. Indicate the rule violated: _____	

TIER 1 – SUBTOTAL (120 points)	

TIER 2 – DOCUMENTATION PORTFOLIO (70 points)				Record scores in the column spaces below.
CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
Portfolio Components (X1)	Portfolio is unorganized and/or is missing three (3) or more components.	Portfolio has most components and is generally organized per the order of the event guide listing; it has sufficient content.	All components are included in the portfolio; content and organization per the order of the event guide listing are excellent.	
Explanation of the Problem(s) (X2)	Problem(s) to be solved by drone is/are difficult to understand or presented in an illogical manner.	Problem(s) to be solved by the drone is/are defined and communicated adequately.	Evidence of a clear definition and explanation of problem(s) to be solved by drone; explanation is presented in an organized manner.	
Communication of Solution(s) (X2)	It is difficult to understand the solution(s) being presented; there is little or no evidence of understanding drone capabilities.	The solution(s) is/are communicated; there is some evidence of research and understanding of drone capabilities and use.	The solutions(s) is/are communicated in a clear concise manner; there is solid evidence of in-depth research and understanding of drone capabilities and use.	
Research/Bibliography (X1)	The research is inadequate, and/or very few credible sources are referenced.	The research is adequate, and it includes a few credible sources.	The research is comprehensive, and credible resources are included.	
Work Log (X1)	The Work Log is not complete.	The Work Log is included and mostly complete.	The Work Log is complete and fully documents project work.	
			TIER 2 – DOCUMENTATION PORTFOLIO SUBTOTAL (70 points)	

Rules violations (a deduction of 20% of the total possible points for the above sections) must be initialed by the judge, coordinator, and manager of the event. Record the deduction in the space to the right. Indicate the rule violated: _____

PRELIMINARY SUBTOTAL (190 points)

SEMIFINAL INTERVIEW (40 points)				Record scores in the column spaces below.
CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
Knowledge (X2)	There is little or no evidence of understanding drone capabilities.	There is some evidence of research and understanding of drone capabilities.	There is solid evidence of in-depth research and understanding of drone capabilities and use.	
Application (X1)	Use of drone solution to problem(s) presented in an illogical manner.	Use of drone as solution to problem(s) communicated adequately.	Use of drone as solution to problem(s) presented clearly and concisely.	
Team Participation (X1)	Majority of the interview responses are made by one member of the team; a partner may be disengaged.	Both team members are generally engaged in the interview, though one member may take on more responsibility.	Both team members are actively involved in the interview and show understanding of the drone solution.	
			SEMIFINAL INTERVIEW SUBTOTAL (40 points)	

Rules violations (a deduction of 20% of the total possible points for the above sections) must be initialed by the judge, coordinator, and manager of the event. Record the deduction in the space to the right.

Indicate the rule violated: _____

SEMIFINAL SUBTOTAL (40 points)	
To arrive at the TOTAL score, add any subtotals and subtract rules violation points, as necessary. **TOTAL** (230 points)	

Comments:

I certify these results to be true and accurate to the best of my knowledge.

JUDGE

Printed name: _____ Signature: _____

DRONE CHALLENGE (UAV)
EVENT COORDINATOR INSTRUCTIONS

PERSONNEL

A. Event coordinator
B. Judges, two (2) or more
C. Pit Area Judge/Inspector (1)
D. Assistants, two (2)

MATERIALS

A. Coordinator's packet and box, containing:
    1. Event guidelines, one (1) copy for the coordinator and for each judge
    2. TSA Event Coordinator Report
    3. Stick-on labels for entries, as needed
B. Time trial record score sheet
C. Qualifier interview time slot sheet
D. Interview questions
E. Testing Arena – two (2) 10' x 10' tents frame only. Covered with bird netting.
F. Course materials based on theme
G. Table with power for the Pit Area for the competitors
H. Table for inspection and tabulation
I. 2-Step ladder with platform for judging and setup
J. Stations or caution tape to separate spectators and participants
K. Safety glasses and vests for judges and coordinators
L. Blue and red tamper proof tape for indicating frequency of controllers
M. Fire extinguisher

RESPONSIBILITIES

AT THE CONFERENCE

A. Attend the mandatory coordinator's meeting at the designated time and location.
B. Report to the CRC room and check the contents of the coordinator's packet.
C. Review the event guidelines and check to see that enough personnel have been scheduled.
D. Inspect the area(s) in which the event is to be held for appropriate set-up, including room size, tables, chairs, etc. Notify the event manager of any potential problems.
E. At least one (1) hour before the event is to begin, meet with judges and assistants to review time limits, procedures, regulations, evaluation, and all other details related to the event. If questions arise that cannot be answered, speak to the event manager before the event begins.
F. Ensure the judges have access to the online judging system.

EVENT CHECK-IN

A. Participants report to the time and place stated in the conference program and check in:
    1. Portfolio
    2. Sign up for setup/testing time
B. Late entries are considered on a case-by-case basis and only when the lateness is caused by events beyond the participant's control.
C. In order to compete, participants must be on the entry list or must have approval of the CRC.
D. Safety vests and safety glasses must be worn at all times during the event in addition to the requirements for attire.
E. Secure the entries in the designated area.

PRELIMINARY ROUND

A. Complete the fifteen (15)-minutes team orientation meeting at the time and place stated in the conference program.
A. Assist judges with the check in/setup of pit area.
B. Assist judges with the drone portion of the event and then the judging of the portfolios of the top sixteen (16) entries following the drone portion.

C. Decisions about rules violations must be discussed and verified with the judges, event coordinator, and CRC manager to determine either:
   1. To deduct twenty percent (20%) of the total possible points in this round or
   2. To disqualify the entry

   The event coordinator, judges, and CRC manager must initial either of these actions on the rating form.

D. Begin the time trials at the scheduled time.
   1. Every Drone that is compliant with rules should have the opportunity to be tested.
   2. Public viewing is allowed.
   3. Announce starting time stop if there is an issue teams do not get additional testing time if they need to complete a repair of adjustment.

E. Position a judge on either side of the testing area to view the trial.

F. If a time is not properly recorded, a rerun may be ordered at the discretion of the event coordinator.

G. Record preliminary times on a time trial record sheet.

H. The testing of the drone times will determine the top sixteen (16) results.

I. Evaluate the top sixteen (16) trials portfolios.

J. Create the semifinalist sign-up sheet.

SEMIFINAL ROUND

A. Post the top twelve (12) teams with interviews times.

B. Drone builders report to the designated area posted time for a ten (10)-minute Drone Team interview.

C. Conduct interviews with the qualifying top twelve (12) Drone Teams.

D. Begin the semifinals at the scheduled time.

E. Discuss rule violations (e.g. 20% deduction, disqualification) and have all relevant parties initial the rating form.

F. If necessary, manage the security and removal of materials from the event area.