UAS4STEM

EAA

AMA FOUNDATION

AMA

DRONE ENGINEERING CHALLENGE

NEW TEAM GUIDE

NEW TEAM FUNDING! APPLY BY OCTOBER 13

If you have questions about the UAS4STEM program, please contact the Education Department at education@modelaircraft.org or (765) 287-1256, extension 517

UAS4STEM

What does it take to be a UAS4STEM team manager?

You don't need to be a drone expert, and you don't need to have all of the answers. What you do need to have is the ability to care about your team and guide students as they seek answers. You will help students prioritize goals and cultivate a positive team dynamic. Most importantly, you will provide a safe, fun, and educational environment. **In short, you inspire.** One of the most rewarding aspects of becoming a UAS4STEM team manager is being able to witness the incredible growth of the students in your care.

Thank you for taking on this role. It's my honor to welcome you to the UAS4STEM competition!

Sincerely,

Kyle Jaracz, AMA Education Director

Kyle Jaracz (far left in blue) congratulating the Advanced Division first-place team, Some Assembly Required, during the awards presentation at EAA AirVenture 2024.

WHAT IS UAS4STEM?

UAS4STEM is a drone engineering challenge like no other! Students work in a team to build, program, and fly a drone. With both Beginner and Advanced divisions, it's a competition for everyone that allows you to participate from anywhere in the world!

Each season mission challenges are presented. These challenges require teams build a drone to specifications and learn how to program it for autonomous flight in order to be successful. All students complete UAS4STEM's virtual Ground School course to learn the basics of safe and legal drone operations in the national airspace.

The virtual preliminary competition, held in the last two weeks of April, gives students the chance to showcase their mission readiness before a panel of judges. Students deliver a presentation about their progress, answer questions, and program a mock mission to prove their knowledge of safe and autonomous drone operation.

Beginner teams focus on learning to fly missions that focus on search/inspection. Advanced teams face the additional challenge of designing and fabricating a mechanism for their drone to complete a specific task during the competition. We encourage new teams to start in the Beginner division. This helps ensure that your students have the time and resources to accomplish the tasks at hand. You may opt to enroll in the Advanced division based on your student's skillsets.

Top-scoring teams from the preliminary competition are invited to compete in-person at the championship competition, which takes place at the Experimental Aircraft Association's EAA AirVenture in Oshkosh, Wisconsin, at the end of July.

See full competition details at www.uas4stem.org.

Trophies on display prior to award presentations.

BENEFITS OF COMPETING

Trophies and $9,000 in total cash prizes are awarded to the first-, second-, and third-place finishers in both the Advanced and Beginner categories at the championship competition.

UAS4STEM students display growth in career-focused skills, including approximately 100 hours of technical experience, leadership development, communication, problem solving, increased self confidence, and positive interactions with aviation professionals.

INVESTMENT

Begin your UAS4STEM experience for only $299, and then pay the remainder of the balance ($1,196). *(Note: we offer a 50% discount for additional teams.)*

A one-time investment is needed to purchase a Quadzilla drone kit ($1,799), or you can source your own components based on the specifications list.

Other equipment (laptop, tools, etc.) is required.

Local fundraising can be a great way to defray the costs associated with the competition.

ELIGIBILITY

Students ages 11-19 are eligible to compete.

Teams must consist of between four and ten students. There are also two adult team manager positions.

All registration costs must be paid by March 31, 2026 to compete.

2025-2026 SCHEDULE

The earlier you begin the better! Teams may meet to practice throughout the year.

Registration open: September 1, 2025

Registration deadline: February 1, 2026

Team manager meetings: Second Monday of each month at 8 PM ET (click to join)

Virtual preliminary competition: April 13–April 29, 2026

Championship competition *(by invitation)***:** July 20-22, 2026 at AirVenture in Oshkosh, Wisconsin.

GETTING STARTED

What the team needs to accomplish before the preliminary competition:

Visit UAS4STEM.org then click "Register" to start.

As you prepare for the competition, keep fun at the forefront! Fun-fly days that include aircraft of all kinds can be great for team bonding.

Submit the team roster. This information is used by AMA staff to process memberships and to create login credentials for the virtual Ground School course which will be sent to you via email. Students ages 11-19 are eligible to compete. Teams range between four and ten students.

Get started on Ground School. To ensure safety, all student team members must pass the UAS4STEM Ground School course prior to the preliminary competition. Some teams go through the material together as a group, while other teams require students to complete it on their own time. This course teaches the basics of drone operations in the US and can serve as a Part 107 FAA drone operator license preparatory course. The Ground School course includes the following modules:

- Fundamentals of Flight
- Fundamentals of sUAS
- Aviation Meteorology
- National Airspace System
- Aviation Safety
- Aeromedical Factors and Physiology
- Radio Communication
- Ethical Airmanship

Purchase a competition-compliant drone (UAS) components. This could be a UAS4STEM bundle from a manufacturing partner or a DIY using the specifications list located in the Appendix of the rule book. This competition requires students to research, develop processes, and build their own drone. This is an integral part of the competition. If you have questions we are here to help!

Designate a laptop to serve as the ground station and download the free ArduPilot Mission Planner software. This software is used to program autonomous flight. Students will need to find resources and take responsibility for learning how to use Mission Planner, which is crucial for success in this competition.

Build the drone. The UAS must be capable of safe autonomous flight for the team to be eligible to advance. Building and repairing the drone provides great experiences for the students. We recommend starting this process early to ensure time for the engineering process. (Video proof is required. Details can be found in the rule book.) The drone should be built and maintained primarily by students.

Find a team flying site. You should find an area with enough space to safely operate your UAS. You will also need to ensure that the airspace is designated for UAS operations. You can learn more by visiting the FAA's B4UFLY page. Remember that you and your team are AMA members and can reach out to existing AMA clubs by using the AMA Club Finder. Use the provided contact to ask about space for your team to fly.

Teams enjoy the night airshow from VIP seating.

Competitors have many chances to share ideas and collaborate across team lines during the challenge.

Conduct test-flight operations and practice missions. We provide files so you can print your own practice resources. A test mission and sample judging sheets can be found in the rule book.

Produce a student-created short video that showcases the team and competition (details in the rule book). This will be included in the team's Flight Readiness Review (FRR) presentation.

Prepare and rehearse an FRR presentation for the judges. Contents and scoring are outlined in the rule book. This should be a live (not prerecorded), spoken presentation that also uses media (such as a slideshow and the scored student-created video) to convey information. Sample presentations are available for you to view online.

Flight Readiness Reviews are conducted at the EAA Museum.

This challenge is great for many different groups. This team formed from both a Civil Air Patrol unit and a Scouting troop.

ORGANIZING YOUR TEAM

Team roles ensure the mission can be accomplished efficiently. Some examples may include:

Team Manager
The adult mentor who oversees the team's overall strategy, organization, and performance, ensuring that objectives are met and resources are allocated effectively.

Assistant Team Manager
Supports the team manager in coordinating team activities and logistics, stepping in as needed to maintain continuity and focus.

Remote Pilot in Command
The designated pilot responsible for the operation of the drone during flight, making critical decisions related to navigation, safety, and mission execution.

Safety Pilot
A trained pilot who assists the RPIC by monitoring flight conditions and maintaining situational awareness, ready to take control if necessary to ensure safety. An adult may act as the safety pilot for drone test flights during training, but this role will need to be transferred to a student team member for the actual flight operations during the competition. The safety pilot should be someone who can fly the aircraft manually using a radio control transmitter.

Visual Observer
A team member tasked with maintaining visual contact with the drone during flight, providing real-time updates on its position and surroundings to enhance situational awareness.

Safety Officer
Responsible for enforcing safety protocols and procedures, ensuring that all team members adhere to safety guidelines and managing risk during operations.

Ground Station Officer/Flight Operations
Manages the ground control station, including communication with the RPIC, monitoring telemetry data, and executing flight plans to support mission objectives.

PRELIMINARIES

UAS4STEM staff will coordinate with the team manager to establish a time slot that fits your schedule. This is a 50-minute virtual session with judges that includes the following:

Flight Readiness Review (FRR) presentation: The team is welcomed and will appear on camera to give a prepared presentation.
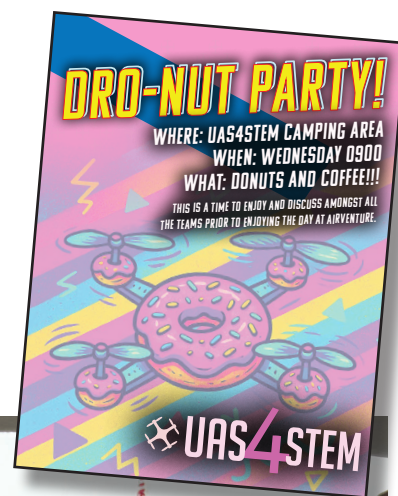
Five questions: For the Beginner division, the judges will ask five different scored questions selected from the Ground School course.

Question and answer: The judges may ask questions regarding the FRR presentation.

Mission planner challenge: Judges will provide special instructions for a mock mission.

The highest scoring teams from the preliminaries will be invited to advance to the championship competition.

Students enjoy donuts on the final morning of the competition.

DRO-NUT PARTY!
WHERE: UAS4STEM CAMPING AREA
WHEN: WEDNESDAY 0900
WHAT: DONUTS AND COFFEE!!!
THIS IS A TIME TO ENJOY AND DISCUSS AMONGST ALL THE TEAMS PRIOR TO ENJOYING THE DAY AT AIRVENTURE.

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CHAMPIONSHIP

Results of the preliminary competition will be relayed during the first week of May.

The championship competition takes place over the course of three days at AirVenture in Oshkosh Wisconsin, graciously hosted by the Experimental Aircraft Association. Weekly admission and camping on site is provided at no charge to UAS4STEM teams (this includes the students and up to five accompanying adults).

The main difference between the championship and the preliminaries is that there are no virtual components. Students deliver the FRR in person and fly the mission on site. Details are provided in the rule book.

There are many opportunities for teams to enjoy themselves at AirVenture. AMA hosts a kickoff pizza party, complete with campfire and s'mores. Don't miss the second-annual Dro-Nut party as well. Did we mention that this is the largest airshow in the world? You'll find ample opportunities to engage in all aspects of aviation. You will also see universities and businesses who are looking for students, interns, and new hires. You're going to have a lot of fun and be presented with great opportunities to learn and grow!

There are no additional fees collected by UAS4STEM to compete in the championship competition. Teams are responsible for any associated travel costs.

UAS4STEM Director Archie Stafford enjoying the flight operations.

CODE OF CONDUCT

The UAS4STEM Code of Conduct is designed to ensure that all participants contribute to a safe, respectful, and productive environment during all UAS4STEM activities. By participating in UAS4STEM, you acknowledge your understanding of these expectations and agree to follow the rules outlined below. Failure to follow the Code of Conduct may result in disciplinary or legal action to include removal from the event and/or future competitions.

1. UAS4STEM is a safe and respectful environment. Participants should act as positive role models, demonstrating leadership, and teamwork. Treat everyone with kindness and respect.

2. UAS4STEM has a zero-tolerance policy for any harassment or abuse. If you see something inappropriate or concerning, it is your responsibility to report it to UAS4STEM leadership and/or a trusted adult.

3. All participants should dress safely for the event. This includes, but is not limited to, wearing closed-toe shoes and other safety gear as required.

4. Treat all property, equipment, and personal belongings with care and respect.

5. The use of alcohol, drugs, e-cigarettes, or tobacco products is prohibited at any official UAS4STEM event activity.

Event Guidelines

1. UAS4STEM is a safe and respectful environment. All participants shall model appropriate behavior and lead by example. UAS4STEM has a zero-tolerance policy for any harassment or abuse.

2. If you witness or are the victim of harassment or abuse, immediately report it to a trusted adult and/or UAS4STEM staff. If you believe anyone is in immediate danger, contact law enforcement immediately.

3. Drugs, alcohol, e-cigarettes, and tobacco products are prohibited during official UAS4STEM event activities.

4. During official event activities, you consent to the use of any photographs, videos, or audio recordings of your participation for promotional or educational purposes by UAS4STEM staff.

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DRONE ENGINEERING CHALLENGE

NOT YOUR GRANDPA'S FLIGHT CLUB

▶ WATCH A VIDEO

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THE SPIRIT OF AVIATION

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WWW.UAS4STEM.ORG