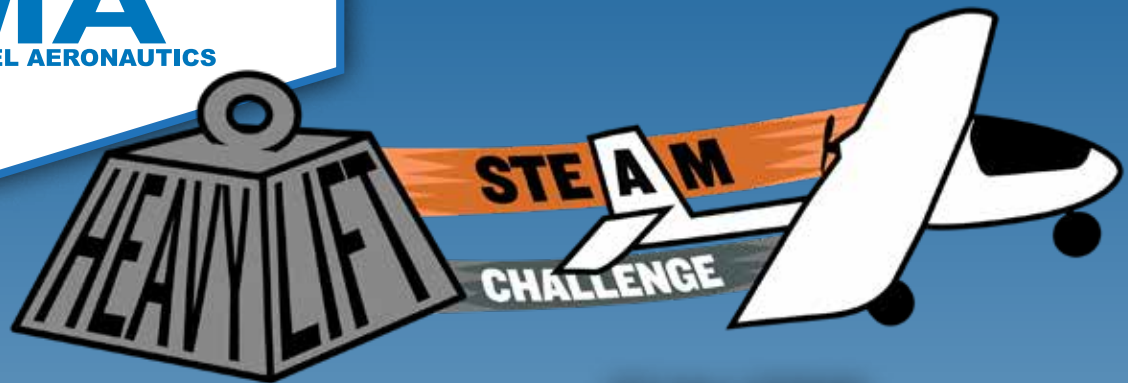




AUTHORIZED AMA
STE(A)M PROGRAM



**FUN FOR
CLUBS, SCHOOLS,
AND FRIENDS!**

AMA Flight School

education@modelaircraft.org

#AMAHEAVYLIFT



AN OFFICIAL DIY RULEBOOK FROM THE ACADEMY OF
MODEL AERONAUTICS EDUCATION DEPARTMENT

MODELAIRCRAFT.ORG | AMAFLIGHTSCHOOL.ORG



THE MISSION

Your mission is to deliver a payload of water to help suppress a local wildfire. Your team has been tasked to deliver as much water as possible to the disaster site, modifying the aircraft to support the increased weight. To accomplish this mission, your team will also need to engineer the payload delivery mechanism that will affix to the aircraft.

ELIGIBILITY

- Any club or group who would like to challenge another group to a competition is welcome to participate. Teams may choose to formally recognize their judging staff and may utilize this rulebook to proceed with this informal competition challenge.
- Teams will consist of 2 to 4 individuals.
- Teams are encouraged to partner with an experienced AMA club/member. Clubs can be located by visiting <https://www.modelaircraft.org/club-finder>
- All flight operations must adhere to AMA safety programming.

Tip: An adult mentor for youth teams won't count as a "member" of the team.

RULES

Modifications to airframe

- Teams must use the Horizon Hobby HobbyZone AeroScout S 1.1m
- Only stock electronics, flight stabilization system, battery, ESC, propeller, and servos may be used from the kit. In the event of breakage, OEM aircraft specific replacements must be used.
- An additional servo/control system can be utilized for cargo pod
- Additional batteries can be used as needed, but only three cell 2,200/2,300 with a discharge rate no higher than 45c will be allowed
- Modifications to the propeller, speed control, receiver, or battery are not permitted
- Fuselage must remain unchanged except for the following modifications:
 1. Wheels may be changed or modified
 2. Cargo "pod", weight box, or similar structure may be attached
 3. Modifications to the cargo area, wing, tail, and horizontal stabilizer are permitted.

Groundschool Training

Competitors should review the following information prior to participating in this challenge:

Fundamentals of Flight

- Radio Control
- Aerodynamics
- Scientific principles of flight
- Weight and balance

Aviation Meteorology

- Atmospheric
- Wind
- Moisture in the atmosphere

Aviation Safety

- Importance of aviation safety
- Inspections
- Operational guidelines
- Lithium-polymer batteries & fuel safety

Flight

- Any flight pattern is allowed, provided each individual demonstrates proficiency in takeoff, crosswinds and downwind technique, final approach, and landing.
- Each flight must be a minimum of 1-minute in length.
- Aircraft must rise off the ground under its own power, unassisted in any way.
- Both empty and loaded flights must be completed on the same day, within an hour of each other.
- All flight operations must adhere to the AMA Safety Code

Contest Submissions

Contest submissions must be both video and text based and may include the following:

Initial footage must show the weight of the ready-to-fly aircraft with battery on a scale, not including the payload, as well as the Air Density Altitude (ADA) that all the flight operations are conducted within. This should be determined before each official flight and shown within the video submission.

Tip-You can use a piece of foam, or similar, to support the full weight of the aircraft hands-free. If this is done, you must first show the scale zeroed out with the foam/support, minus the aircraft.

After the aircraft has been weighed, footage must include each individual completing a minimum 1-minute flight pattern that includes proficient take-off, crosswind and downwind technique, final approach, and landing. Wind conditions should be visibly

demonstrated.

Once team members have completed their solo flight, the footage must show the team members adding the payload to the aircraft followed by weighing the loaded aircraft onto the scale once more, using the same technique as in step 1. This will allow the judges to determine the amount of water that is being transported.

The final footage will include the successful takeoff, including payload. The flight pattern must include proficient crosswind and downwind technique, final approach, and landing. The minimum flight time will again be 1-minute.

All results should be organized and documented in a logbook. Copies of the logbook should be compiled and provided to the judges by sending them digitally to education@modelaircraft.org. The subject line should read "Heavy Lift Challenge Logs" followed by your team name.

Extra points will be awarded to teams that can successfully release the payload from the aircraft without physically touching the aircraft post flight.

Extra points will be awarded to teams that submit footage of their experience outlining various aspects of the challenge, such as planning, scope, and depth of the testing performed, modifications, and preparations made to improve the aircraft's performance.

Contest entry must be submitted using YouTube, Vimeo, Google Drive, dropbox, or another suitable platform.

SCORING

CATEGORIES	POINTS AVAILABLE	POINTS EARNED
Safety	10	
Weight (after ADA bonus calculations have been applied)	10	
Solo flight	5	
Payload transport	10	
Bonus payload delivery	5	
Bonus experience/journey	10	
TOTAL	50	

Safety

Aircraft safety inspection must be completed prior to flight. All flight operations adhere to the AMA Safety Code. This category is all or nothing, meaning all safety requirements must be demonstrated or the team will receive a score of zero. This category is worth 10 points.

Weight

Video submission includes accurate weighing of the aircraft before and after payload is added. The aircraft must be weighed twice, first without a payload, and second with payload. The team that successfully flies the aircraft with the most weight will receive the full 10

points. The scores of the remaining teams will be graded on this curve. Zero points for the lowest weight entered, 10 points for the most weight successfully flown. *Tip: You can add weight over time while documenting the flights, until each team successfully flies each specific weight. Flight operations cease once you decide that the maximum weight has been achieved, or you exceed the skill of the weakest pilot on the team.*

Solo Flights

Each team member successfully completes a solo flight according to the rules outlined. This category is worth a total of 5 points. Because teams may consist of 2 to 4 individuals, 1 point will be deducted for each available team position that does not successfully complete a solo flight. *Example: If a team consists of three individuals, each of whom complete the flight, one point will be deducted from the score resulting in four points awarded. Similarly, if a team consists of four members, but only one pilots the aircraft, two points will be awarded.*

Payload Transport

The payload is successfully transported and remains intact through the duration of the flight. This category is worth 10 points and is judged as a pass/fail.

Air Density Altitude ADA

The density of the air you are flying in plays a huge part in how well your aircraft can achieve lift. The less dense the air, the less lift and propeller efficiency, which results in longer takeoff and landing, and increased groundspeed before similar lift is achieved. To more accurately judge this competition, we have developed this category to accurately establish a baseline. The air density equation should be determined before each flight occurs and should be identified within the video submission. For every 200 feet of air density altitude, an addition of 1% of the payload weight will be added. Example, if you are carrying 16 oz. and have a calculated ADA of 4,568, you would add 22.84% to your payload, resulting in a total payload of 19.65 oz.

How to Calculate ADA

Density altitude in feet =

Altitude in feet + (120 X [OAT - ISA temperature])

OAT stands for outside air temperature (in degrees Celsius)

ISA stands for standard temperature (in degrees Celsius).

TIP: More information is available by visiting www.aopa.org/training-and-safety/active-pilots/safety-and-technique/weather/density-altitude#CDA

TIP: You can also choose to utilize an air density calculator app on your mobile device such as "Density Altitude Calculator".

BONUS SECTION

Payload Delivery

The payload is successfully drained post flight. This category is worth a 5 point bonus.



Experience/Journey

Team footage includes their journey throughout the challenge, outlining various aspects of the challenge, such as planning, scope and depth of the testing performed, modifications, and preparations made to improve the aircraft's performance. The scoring for this category will be at the discretion of the official contest judges. This category is worth a maximum of 10 points.

DISCLOSURES

Contest judges reserve the right to consider any variations because of a contestant's disability and have the right to disqualify any participant whom isn't competing within the spirit of the contest. Contest scores are final and at the discretion of the official contest judges. By competing in the Heavy-Lift STE(A)M Challenge, teams grant the right to edit, use, and reuse said products for nonprofit, noncommercial purposes, including in print, online, social media, and all other forms of media. The team consents to the use of its name, team members' names, and their association with the Academy of Model Aeronautics for the foregoing purposes. I give this authorization without expectation of compensation.

Submissions by youth members (18 and under) will be accompanied with a parent-signed media consent form, which can be downloaded at: <https://www.modelaircraft.org/sites/default/files/205.pdf>.

Youth teams can work with an adult mentor(s), but must independently complete the challenges in the video submission.