

2025 CAP Col Joe Kittinger National AE High-Altitude Balloon Challenge for Cadets Program Guide



Featuring the 2024 Kittinger Cup Winners:
GLR-OH-131 Cuyahoga County Cadet Squadron

See CAP.NEWS November 2024 article:

[Ohio Wing Cadets Take 1st in 2024 High-Altitude Balloon Challenge](#)

Foreword

The national HQ CAP AE team designed the National High-Altitude Balloon Challenge for Cadets in 2021 as the first national cadet STEM challenge. The Challenge can be accomplished at individual squadrons, for an interested group of squadron cadets, and involves science, technology, engineering, and math - with an arts component for a full STEAM program.

The HAB Challenge Ambassador at the onset was [Col Joe Kittinger, famed high-altitude aerospace physiologist and test engineer](#). Col Kittinger desired to not only be the ambassador, but to be the consultant for the program and mentor to cadets for them to gain interest and experience in space science exploration.

Kittinger also became the benefactor of the \$5,000 Kittinger Cup prize. The Kittinger Cup is earned by the squadron which excels in every category of the challenge: mission patch design, pre and post launch videos, and most importantly to Col Kittinger, an innovative and well-developed and analyzed science experiment which flew to the edge of the Stratosphere.

Since Kittinger's passing in December 2022, his widow, Mrs. Sherry Kittinger, has carried the torch for Kittinger's desire to support CAP cadets. She now donates the Kittinger Cup prize money each year.

From the beginning, the Indiana Wing of CAP has been the launch site for the actual balloon launch day, which has included an incident commander who coordinates the three missions of CAP: operations, cadet programs, and aerospace education. The INWG team has coordinated airplanes, drones, and chase ground teams to conduct a Search and Rescue mission. They have also hosted a ground team which has involved cadets in the packaging of the science experiment vials as payload of the HABs, the coordination of the HAB launch, and the retrieval of the science experiment payloads to be shipped back to all the participating squadrons.

After the launch, the teams analyze their science experiment and submit all their deliverables for judging by the HABC leadership team to score and rank the top teams in each category, ultimately revealing the overall winner of the Kittinger Cup and the Kittinger family donation of the \$5,000 prize. The [Air & Space Forces Association \(AFA\)](#) provides unit award grants for winners in each of the deliverable categories.

For 2025, the process will continue with a few changes to dates for deliverables from the teams. The contents of this program guide will provide the timelines, guidance, and scoring rubrics the teams will use to prepare their deliverables. The judging teams use these rubrics to score and rank the submissions in each category.

To find details about each section of this guide, just click on the program guide section in the Table of Contents.

For further information, contact HAB@capnhq.gov

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(Click on the chapter needed to get direct chapter access.)

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- Includes detailed information about each deliverable which every team should read carefully to ensure each deliverable direction is followed exactly. Also includes directions for the teams to submit each deliverable by its due date.
- **NEW Logo Information for 2025:**
NO CAP logo is to be used on the mission patches this year.
If desired (not required), the CAP Flying V **can be** used on the science/research poster/slide and/or the pre and/or post launch videos. IF used, follow guidance for approved CAP Flying V logos for HABC use on slides & in videos.
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1- Team Registration and General Information

The fifth annual national AE cadet STEM challenge, the **2025 Col Joe Kittinger CAP National High-Altitude Balloon Challenge for Cadets (HABC)**, team registration is open from 1 April until midnight local time 18 May. This is an extended registration date. (Late registrations will not be accepted after this date.)

- Registrations will be accepted from the squadron commander or AEO for this AE program. (Cadets may not register.)
- Whomever will be the HABC Project Lead will need to include all personal shipping information as that is where all HABC shipments will go.
- Whomever registers should notify the rest of the leadership team (including the DCC) and seek interest from cadets who wish to join the squadron team. (Cadet team members can be selected AFTER the team registers.)
- The CAP National High-Altitude Balloon Challenge for Cadets is an internal program for cadet and/or composite squadrons. For squadrons that submit their mission patch and capsule with their experiment for launch by the due date, below, the squadron's name will be sent to * **Cadet Programs NHQ to be registered as having participated in the HABC program for QCUA credit.**

If a squadron desires to field a team, the following information should be helpful:

1. There is no cost to the squadron for this program.
2. Only one HABC team per squadron.
3. Any number of cadets can work on a team (2-20+ but ensure all cadets will have a way to contribute to the team).
4. Cadet team member names will be requested AFTER registration closes, so there is time to build the desired team after registration.
5. Teams can begin working on their science experiment(s) to fit in the science capsule (explained in section 3) before the capsules are shipped to the teams. (All capsule boxes will be shipped by 19 May.)
6. Teams will be provided shipping boxes and shipping labels to ship their experiment capsules back to NHQ for transport to the August launch site in Indiana.
7. The challenge competition includes areas where different cadets can make contributions: team mission patch (digital or hand-drawn); pre-launch video; post-launch documentary video; and one science experiment informational/research poster/slide.
8. A scoring rubric for each category is provided so the teams know prior to submissions exactly what is expected for each category.

2- HABC Schedule & Due Dates

01 April – Registration opens.

- Teams can begin researching and designing the science experiment(s) for the program before the capsules are sent to the squadrons (using the experiment guidelines found in the next section).

18 May – Registration closes at midnight (local time); no late registrations will be accepted.

19 May – HABC Science Experiment Capsule boxes will be shipped to squadron Project Lead from National HQ (if not already shipped).

- NHQ will also include a shipping label to be used to ship boxes back to NHQ for transport to the August launch site.

24 May – All materials should have arrived at each squadron Project Lead's address.

18 July – Deadline for squadrons to ship boxes with capsules back to NHQ for transport to Indiana launch site.

- Use NHQ shipping label included in boxes shipped to squadrons in May.
- If the squadron misplaces the shipping label, the team may need to pay for shipping back to NHQ. (Contact HAB@capnhq.gov if this happens).

18 July – Deadline for squadrons to submit TWO deliverables: the hand-drawn OR digital HABC mission patch AND the pre-launch video via the Google doc to be sent to squadrons for this deliverable (found in Section 4 below).

02 August – Primary launch day of high-altitude balloons (HABs).

- Will be live streamed and/or recorded with link sent to all teams.

All squadrons' experiment boxes will be at the Indiana launch site to be prepared for launch. Each team's test (flight) capsule will be placed in the payload boxes. Then payload boxes will be attached to the HABs and launched.



9 August – Weather reschedule date for launch in IN.

*** After either the 2 August or the 9 August launch, the INWG HAB Incident Command team will coordinate the retrieval of the payloads and return these to the launch site. The launch site team will repackage each team's test (flight) capsule in the capsule box to be shipped back to the squadron for experiment analysis.

14 August – Squadrons' HABC capsule boxes should have arrived back to the squadron Project Lead. Teams can then begin to analyze the results of the experiment(s).

NOTE: Extra time is being provided this year for teams to analyze the results of the experiment before the final two deliverables are due. Eight weeks are provided for this purpose, as noted by the 9 October date, below.

9 October – Deadline for squadrons to submit final two deliverables via Google doc links to be provided to squadrons:

- One science experiment results slide/research poster (**select the ONE best experiment about which to submit report document**)
- Post-launch documentary video (5-minute limit)

6 November – HABC Awards Show to announce the \$5,000 Kittinger Cup winner and all category winners:

- 2000 hours Eastern Time
- Live stream or recorded video link will be provided to squadrons

3- Important Capsule/Test Tube/Experiment Info and Instructions

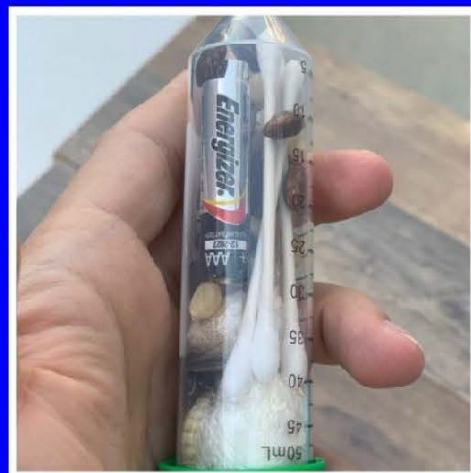
- Standard 50ml centrifuge capsule/test tubes are provided to teams (one for flight and one for control).
- Approximate capsule dimensions are 30mm (outer diameter); 115mm length.
- Capsules have a screw-on cap but are not pressurized.
- Will be launched as payload of a high-altitude balloon in a container that is not pressurized and is open to the atmosphere and sunlight when launched.
- Will be packed next to other tubes in the payload container, so if there is an experiment that needs sun and radiation exposure, the experiment would need to be pushed toward the top (cap area) of the tube.
- Each team will have a control test tube and a flight test tube – each labeled as such so when received in Indiana by the HABC team will ensure the correct tube is launched.

HABC Experiment(s) Guidelines

Two experiment capsules will be shipped to each registered squadron. One is the test (flight) capsule and one is the control capsule. The capsules must duplicate each other.

Each squadron has the same rules and physical constraints to innovate their experiment(s) within their capsules:

- 40g weight limit each (including capsule)
- No limit on the number of experiments included in the capsules
- Must fit within provided 50ml capsules
- No liquids
- No food which requires refrigeration
- No live vertebrates or invertebrates
- No radioactive materials
- No explosive materials
- If any switch to turn on battery or tracking device is used, complete instructions are to be included with the capsules when shipped to launch site



- **Find science experiment ideas by searching High Altitude Balloon Experiment Ideas. One site is [HERE](#).**

- More than one experiment can fit in a tube if the 40g (total) weight limit (including capsule) is not exceeded. (If the weight limit is exceeded, it cannot fly. It will be a “no go” capsule.)
- Recommend putting individual experiments in their own small baggies before putting them into the capsule so it's easy to keep them organized.
- If there is something the HABC team needs to do to the test (flight) and control capsules before flight, **EXPLICIT instructions need to be included in the capsule box**. (Note: the HABC team can turn on power or something simple but nothing detailed nor time sensitive as these actions will be done well before the launch. What is done for the flight capsule will need to be done to the control capsule.)
- Remember that both the control and flight test tubes should have the exact experiment(s) and packing order for your challenge to be valid.

Questions not answered here? Contact HAB@capnhq.gov

4- Guidance for the HABC Deliverables in Each Category

*The Challenge requires several projects to be submitted for judging to be eligible for consideration for the ultimate Col Kittinger Cup and \$5,000 award prize. Those squadrons with **top scores in all categories** will be judged for the top Kittinger Cup award.*

Several category awards will also be presented with unit grants provided by the [Air & Space Forces Association](#).

See the deliverables submission dates, scoring rubrics, and submission information below.

IMPORTANT:

Read all directions and scoring rubric guidance for each deliverable VERY carefully to ensure each category item meets highest standards BEFORE they are completed.

Pay close attention to the "Go/No-Go" section at the top of each category's scoring rubric. If the item does not meet the "Go" criteria and is deemed a "No Go" and no further judging/scoring will be done on that item. Thus, it is important to follow the scoring rubrics explicitly.

- The HABC team has included [AI Guidance](#) for this program, so ensure this information is read prior to starting any part of the program deliverables. Submission of your deliverables will include a statement that says you have read and followed the AI guidance.

Experiment Capsule Box Due to NHQ by 18 July: Prior to the high-altitude weather balloon flights in Indiana on the launch date of 2 August or back-up launch date of 9 August, each squadron team is directed to create, pack, and ship one (or more) science experiment(s) inserted in the 50ml Challenge capsule. The total weight of the experiment(s) and the capsule cannot exceed 40g. Both the control and flight capsules should be packed in the original HABC box and the box placed in the outside shipping box originally provided.

- If there is something the HABC team needs to do to the test (flight) and control capsules before flight, **EXPLICIT instructions need to be included in the capsule box**. (Note: the HABC team can turn on power or something simple but nothing detailed nor time sensitive as these actions will be done well before the launch. What is done for the flight capsule will need to be done to the control capsule.)

Using the return label provided to each team, the box should be shipped back to the NHQ by 18 July. (See test capsule instructions in section 3.)

- The ship date on package cannot be later than **18 July** to have the team's experiment(s) accepted back at NHQ for the actual launch event in August. If the shipping date is late, the team's box will be returned without having flown on the weather balloon.
- A shipping label is provided to each team in their original HABC capsule box sent to them from NHQ after registration.

- If the pre-prepared FedEx shipping label is MISPLACED/LOST, contact HAB@capnhq.gov to get a copy of that label.
- **If the squadron decides to ship on their own, the address for shipment is:**
 Civil Air Patrol NHQ
 ATTN: Susan Mallett or Rolland Greyhek
 30 S Arnold Street Building 848
 36112 AL Maxwell AFB
 Phone: 334 953 9184 (Rolland Greyhek)

Four Deliverable Items – Due Dates and Information

- 1- **Team Mission Patch by 18 July:** Each squadron is directed to submit **EITHER (not both) a hand drawn or digitally designed mission patch** via the mission patch submission form link that will be sent to the squadrons.
 - Patches should be designed to be viewed no larger than 4”x4”. (Patches do not have to be square but cannot fall outside this size constraint.)
 - Submit a photo or pdf of the mission patch (photo of hand-drawn patch is easiest). Digitally designed patch cannot be AI generated.
 - **NEW for 2025! No CAP logo should be used on the patches this year (due to the alterations used in the design process).**
 - **Mission patch** expectations and scoring rubric (READ CAREFULLY)
 - **Teams should review the exceptional scoring area column and strive to meet that level for submission.**
 - A \$200 AFA grant will be provided for each winning hand-drawn mission patch and winning digital mission patch.

- 2- **Prelaunch Video Due 18 July:** The teams are directed to submit **a 2 - 2.5 minute pre-launch video created by the cadets** to describe the science experiment(s) included in the capsule. This should be submitted via **submission form link that will be sent to squadrons.** Any accompanying music guidance for the video is provided in the expectations and scoring rubric, below.
 - **Pre-launch video** expectations and scoring rubric (READ CAREFULLY)
 - **Teams should review the exceptional scoring area column and strive to meet that level for submission.**

- **NEW Logo Information for 2025!** If desired (not required), the CAP Flying V can be used on the pre-launch video. IF used, follow approved CAP Flying V logo guidance. Clear background/full CAP name with no alterations allowed:
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- A \$200 AFA grant will be provided for winning pre-launch video.

After the capsules' August HAB flight in Indiana, the boxes will be returned to the squadrons within 5 days.

- The squadron teams will then work on the analysis of their experiment(s).

- 3- **Science Report/Research Poster Due 9 October:** The squadron team will prepare **ONE after-action slide report/research poster of their ONE best science experiment** to be submitted via the **submission form link which will be sent to squadrons. No matter how many experiments were included in the capsule, ONLY ONE research poster will be submitted (and accepted). If more than one is submitted, this is a “No Go” for scoring.**

IMPORTANT INFO to ensure the science slide meets all requirements:

- [Final science experiment slide / research poster for ONE best team experiment](#) expectations and scoring rubric (READ CAREFULLY)
 - **Teams should review the exceptional scoring area column and strive to meet that level for submission.**
- **Research report/slide can be prepared in PowerPoint, Google slides, or similar applications and should be submitted as pdf.**
- **NEW Logo Information for 2025!** If desired (not required), the CAP Flying V can be used on the science/research poster/slide. IF used, follow approved CAP Flying V logo guidance. Clear background/full CAP name with no alterations allowed:
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- The slide/poster should include squadron charter number/name, background, hypothesis, testing methods, materials, procedures, data analysis, results, conclusion, impact of experiment for the future to live and work in space, possible improvements (if needed), and references used (to include subject matter expert consultants). Pertinent photos and/or graphic support should also be included --- much as the sample 2024 slide below (minus the mission patch this year).
 - [SEE EXEMPLARY SAMPLE SCIENCE SLIDE/RESEARCH POSTER HERE](#)

- A \$300 AFA grant will be provided for the most innovative science experiment with the most well-done report slide/research poster (as this was the most important aspect of the HABC to Col Kittinger).

4- Documentary/Post Launch Video Due 9 October- Vimeo submissions only: A culmination "documentary-style" 4-5 minute video created by the cadets which describes the entire Challenge process is to be submitted via **submission link to be sent to squadrons** and include:

- experiment(s) and associated results after the HAB launch;
- any collaborative efforts made with other groups/organizations/etc. (universities/schools, medical or science orgs, or other CAP units);
- how the Challenge was beneficial to the cadets (what they learned as a team through the process); and
- what the squadron would do with the \$5,000 Kittinger Cup prize if it was won.

Music usage guidance and Vimeo submission info for video are found in expectations, guidance, and scoring rubric, below.

- **Post-launch documentary video expectations, guidance, and scoring rubric (READ CAREFULLY)**
 - **Teams should review the exceptional scoring area column and strive to meet that level for submission.**
- **NEW Logo Information for 2025!** If desired (not required), the CAP Flying V can be used on the post-launch documentary video. IF used, follow approved CAP Flying V logo guidance.
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- A \$350 AFA grant will be provided for winning documentary video. *Additional unit grants will be selected by the judges and provided by the AFA.*

FAQs:

- 1- When do the cadets need to be selected to be on the team?
A- Cadet team members should be assigned to the team by 1 July, which is time to participate in the first set of deliverables to be submitted to NHQ on 18 July.
- 2- Does the team have to submit all four categories of deliverables to participate in the program?
A- NO. Unless a team is trying to win the \$5,000 Kittinger Cup prize, all categories of deliverables do not need to be submitted.
- 3- How does the team get credit for the Quality Cadet Unit Award (QCUA)?
A- To receive QCUA credit, at a minimum, the team must submit a mission patch deliverable and ship the experiment capsule box back to NHQ by the 18 July due date for participation in the August launch event.
- 4- What if our deliverable in any category misses inclusion of something in the scoring rubric's "Go/ No Go" section at the top of the rubric?
A- If every section of the "Go/No Go" is not complete, the judges will mark the deliverable as a "No Go" and the item will not receive any further judging or scoring.
B- Suggest following the Exceptional column on the scoring rubrics to ensure the best possible score.

Any further questions not addressed in this guidebook can be answered by contacting HAB@capnhq.gov.