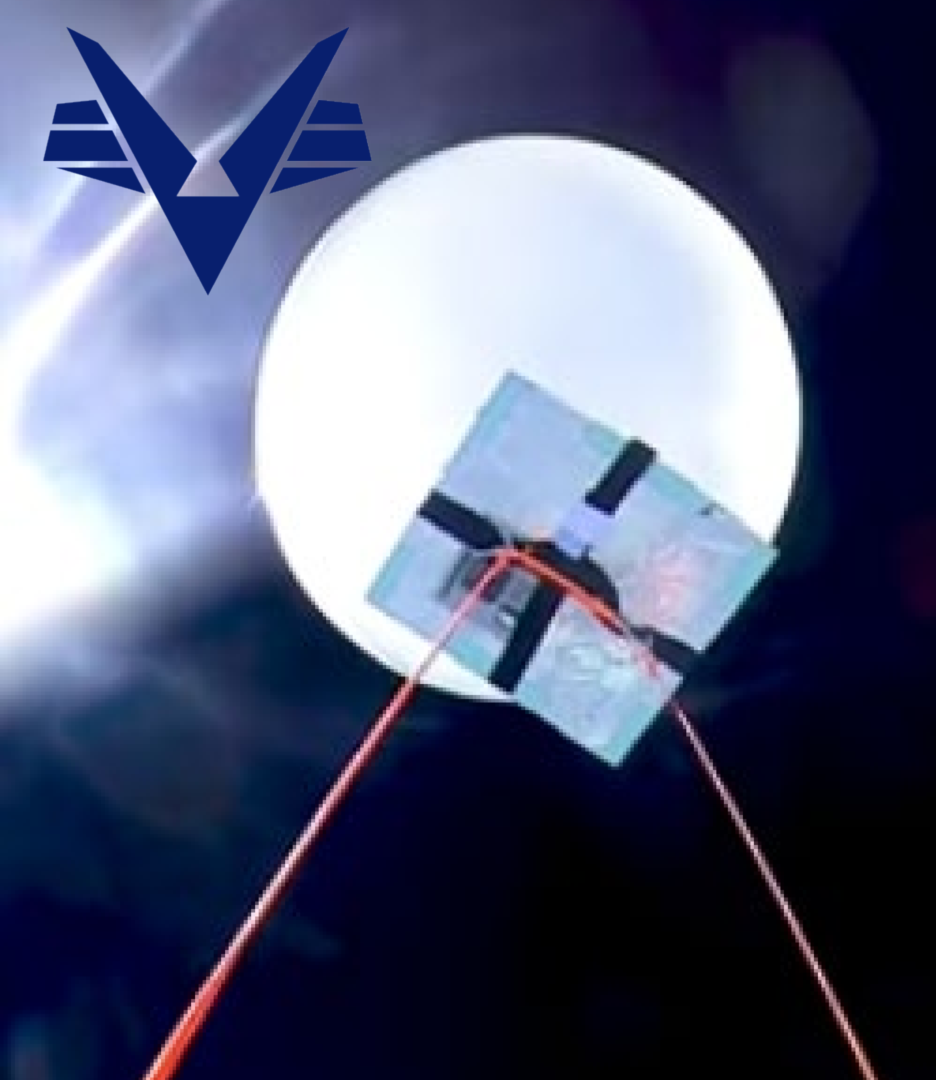

CIVIL AIR PATROL
U.S. AIR FORCE AUXILIARY



Civil Air Patrol

presents

the

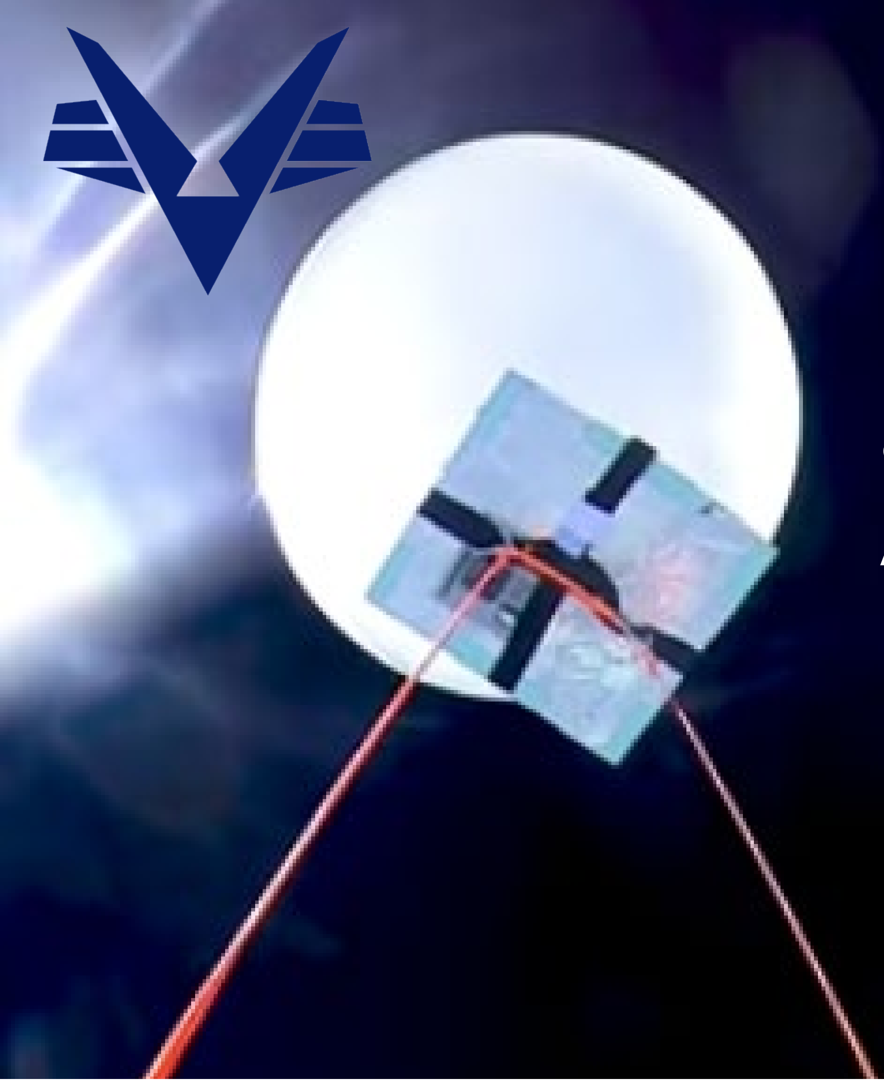
2022

National AE

High-Altitude

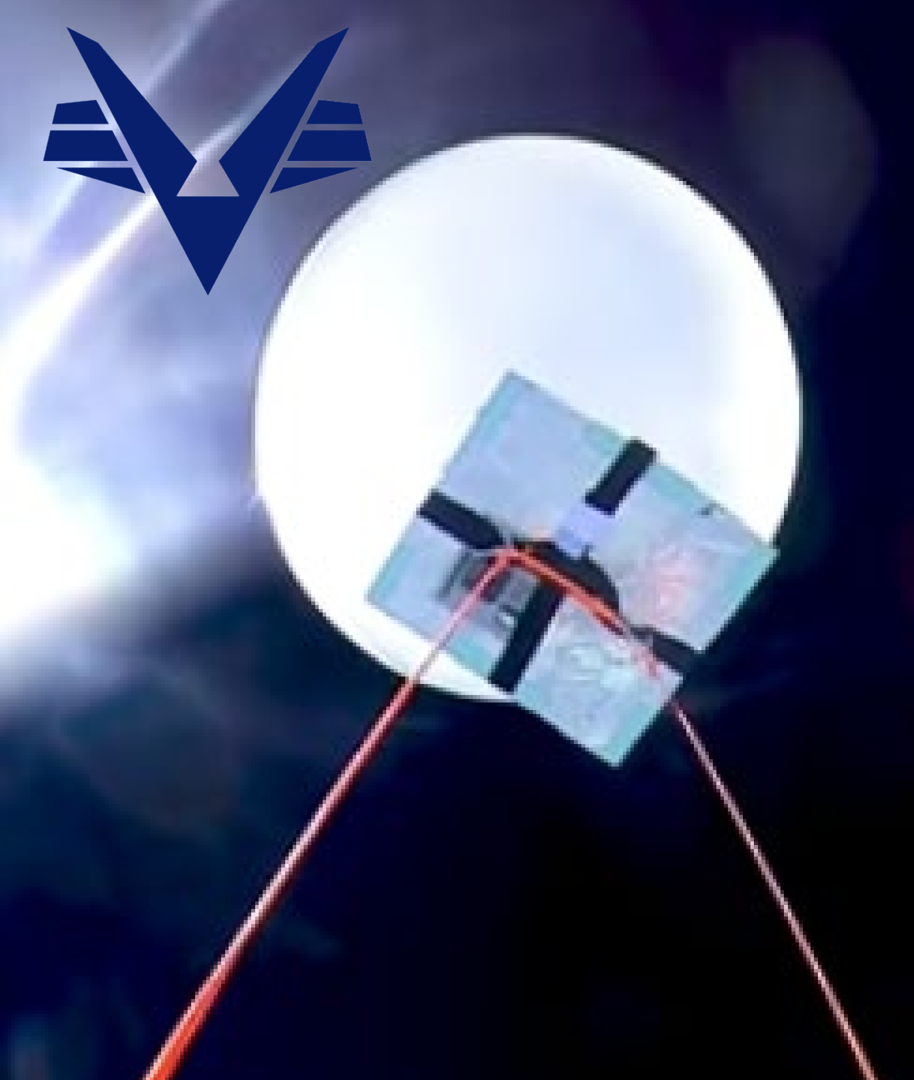
Balloon Challenge

Awards Program



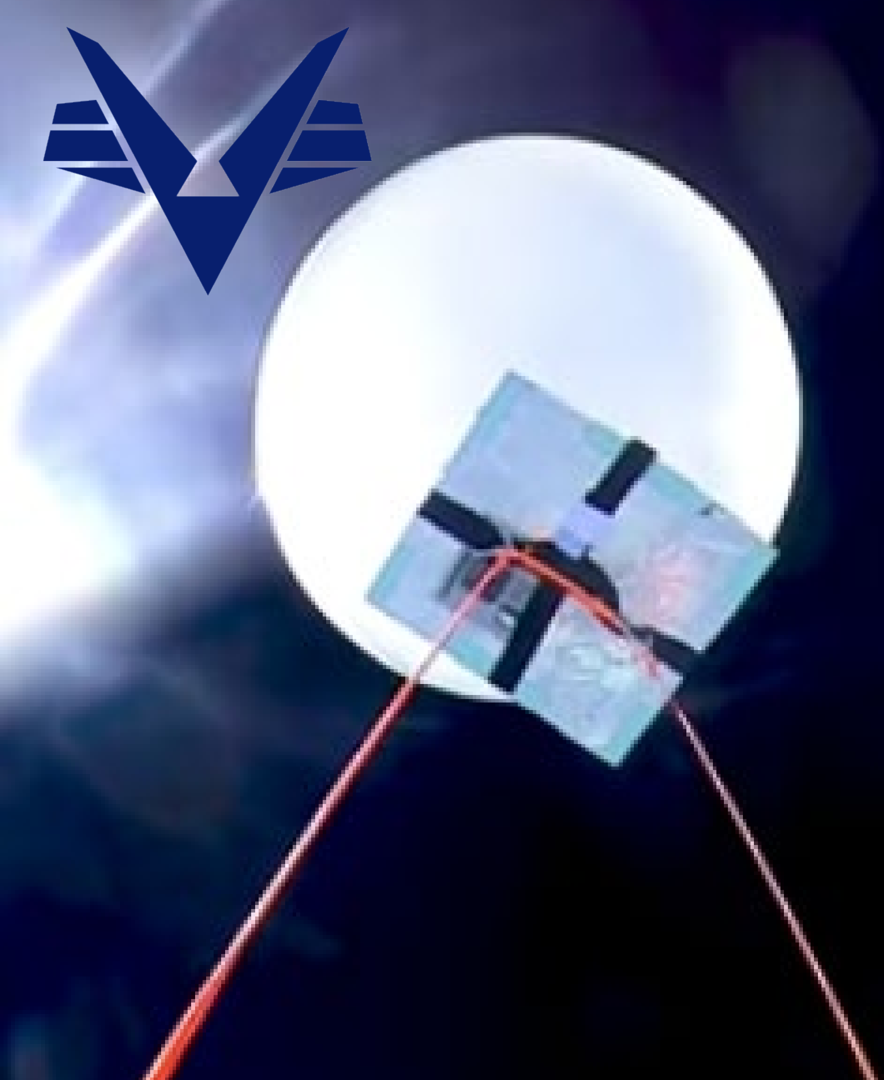
Capt Bob Roberts, HABC Program Director and SC Wing Director of Aerospace Education posted the awards program video on his

AE YouTube Channel.



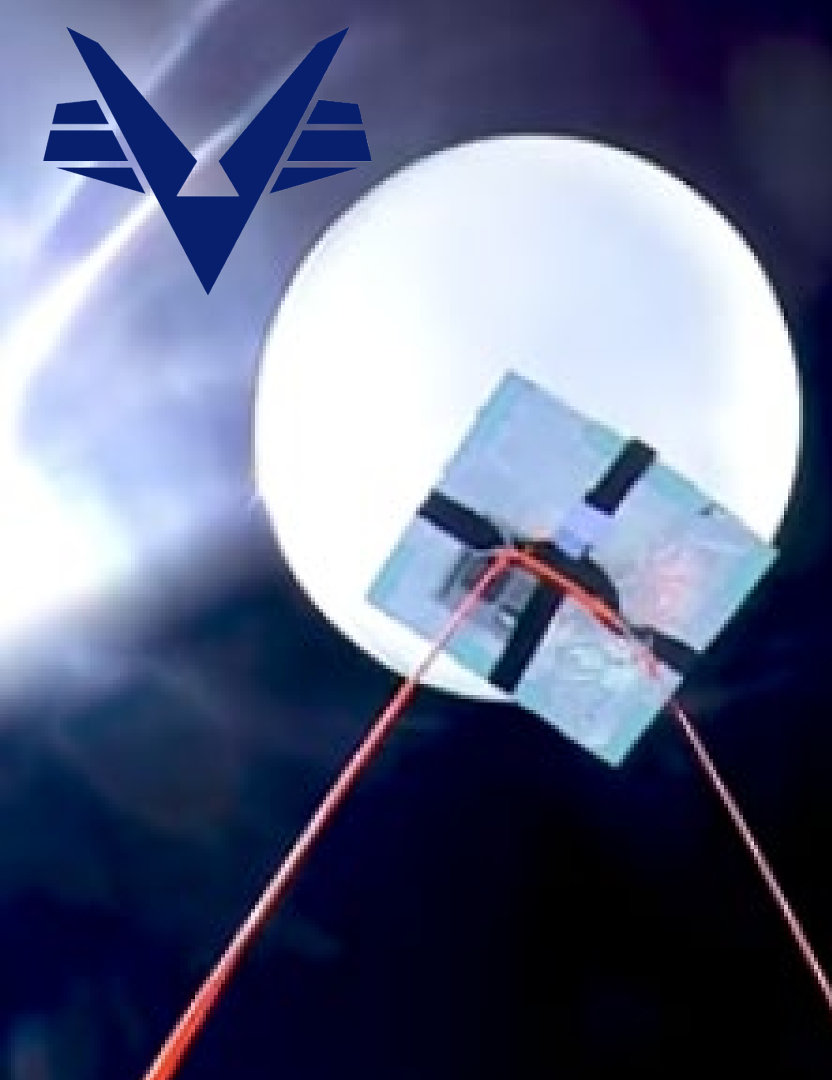
Susan Mallett,
HABC Program
Coordinator,
CAP National HQ

Welcome Remarks
HERE



Dr. Jeff Montgomery.
Director,
Aerospace Education
CAP National HQ

Welcome Remarks
HERE



Awards Announcements

If any team was expecting to win in one or more categories, and did not do so, there would be two reasons to consider:

1- The team’s entry was very good, but there were “many” excellent entries in the specific category; decreasing the chances ot winning.

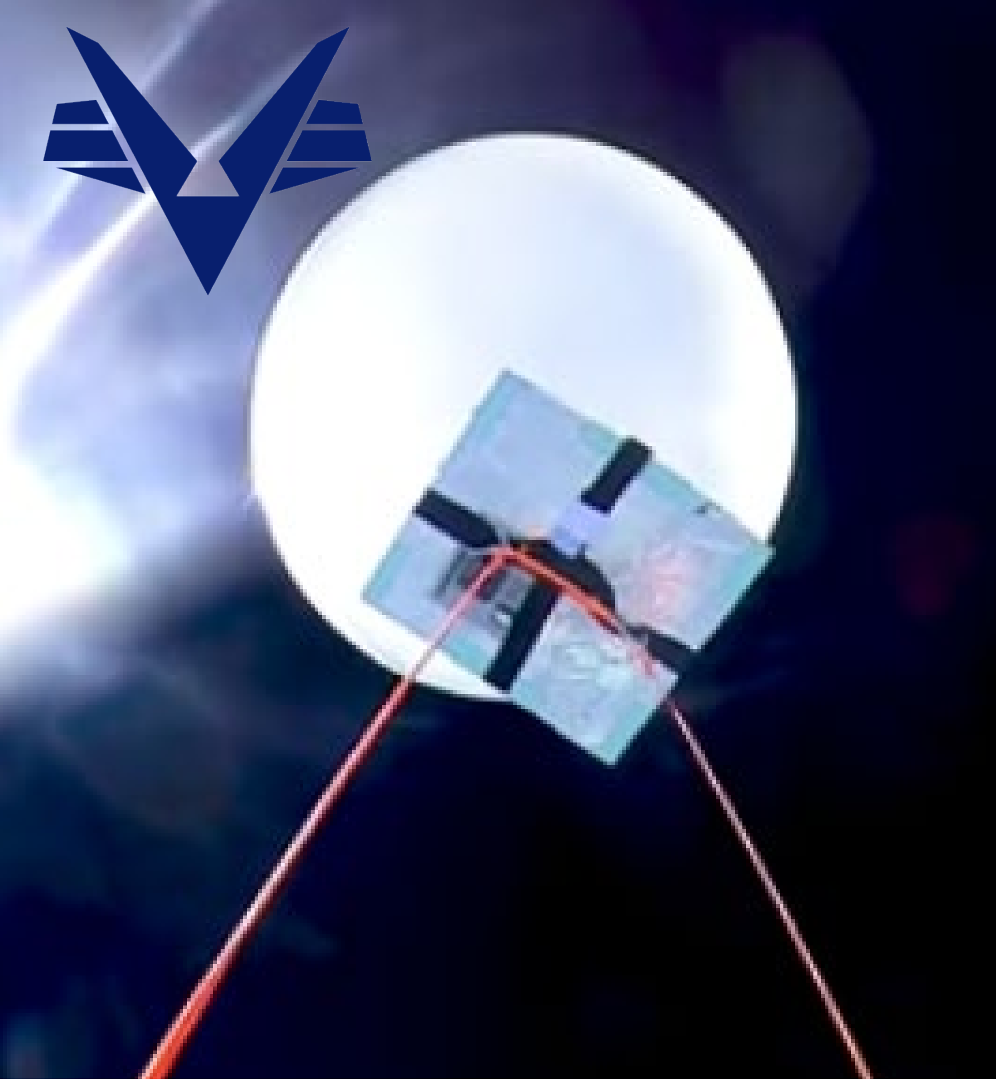
2- The team failed to include one or more items listed on the scoring rubrics provided as expectations and guidance for each category.

Awards Announcements

Due to the outcome of the scoring in each category, the HAB team made adjustments to the award titles and awarded more awards than last year.

The AFA award grants should enable the winners to conduct more STEM projects in the coming year.

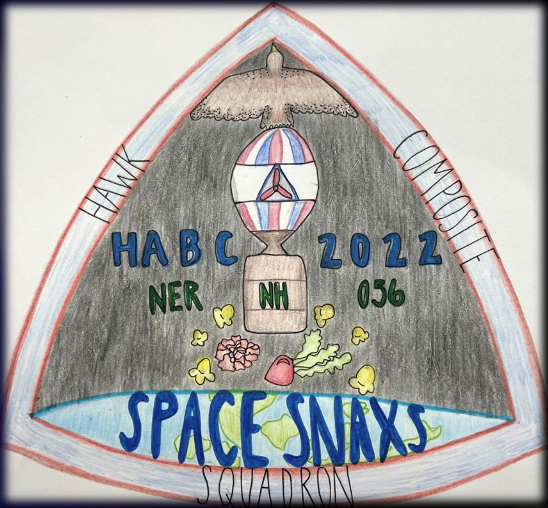
Congratulations to all the following award winners!



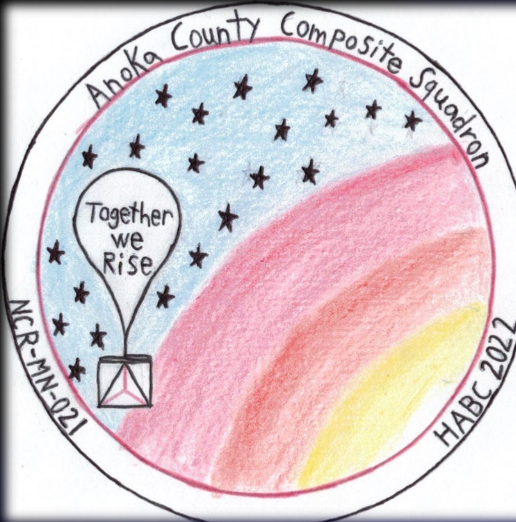
Hand-drawn Mission Patch Category

Hand-drawn Mission Patch Finalists: $100 Grants

PCR-HI-077
77th St. Louis Crusader Composite Squadron



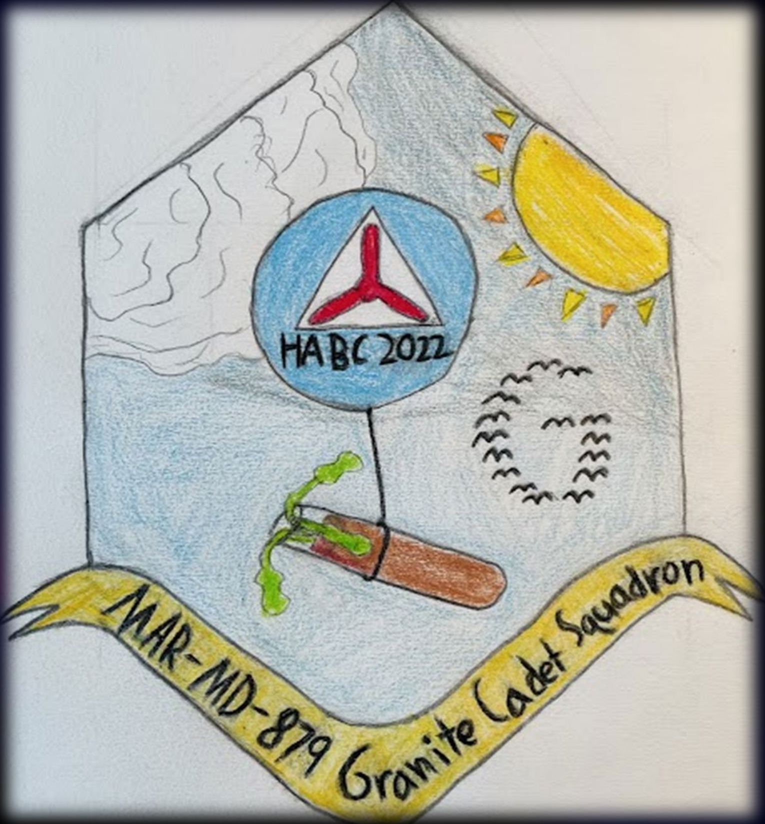
**NER-NH-056 Hawk Composite Squadron



NCR-MN-021 Anoka County Composite Squadron

Hand-drawn Mission Patch Winner:

$250 Grant
& Placement on
2022 Certificate



MAR-MD-879
Granite Cadet Squadron

Digitally-drawn Mission Patch Category

Digitally-drawn Mission Patch Finalists: $100 Grants

GLR-IN-223
Anderson Composite
Squadron

GLR-WI-037
La Crosse
Composite Squadron

Digitally-drawn Mission Patch Finalists: $100 Grants

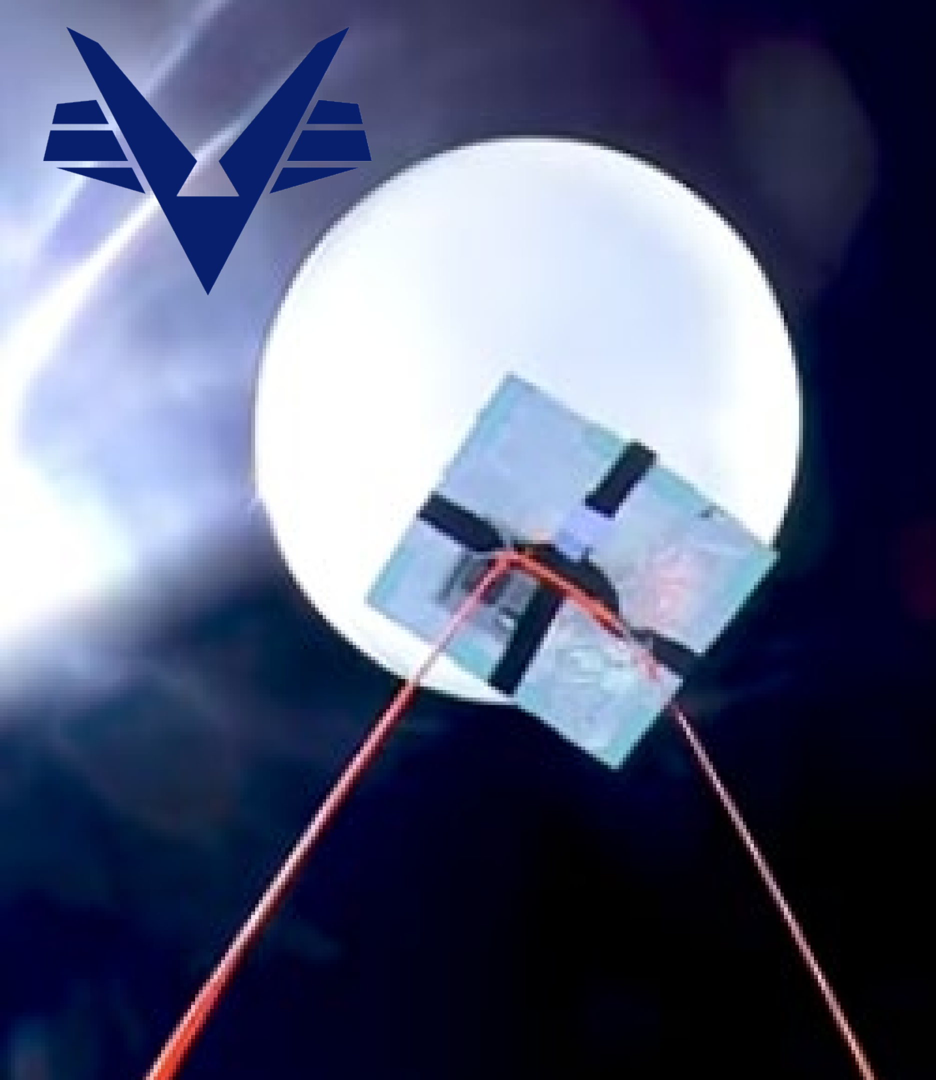
NER-MA-043 Hanscom Composite Squadron

RMR-CO-080 Pikes Peak Composite Squadron

Digitally-drawn Mission Patch Winner:

$250 Grant & Placement on 2022 Certificate

NER-NJ-086 Maj Thomas B. McGuire Composite Squadron



Pre-launch Video Category

Click on each team patch to view the video.

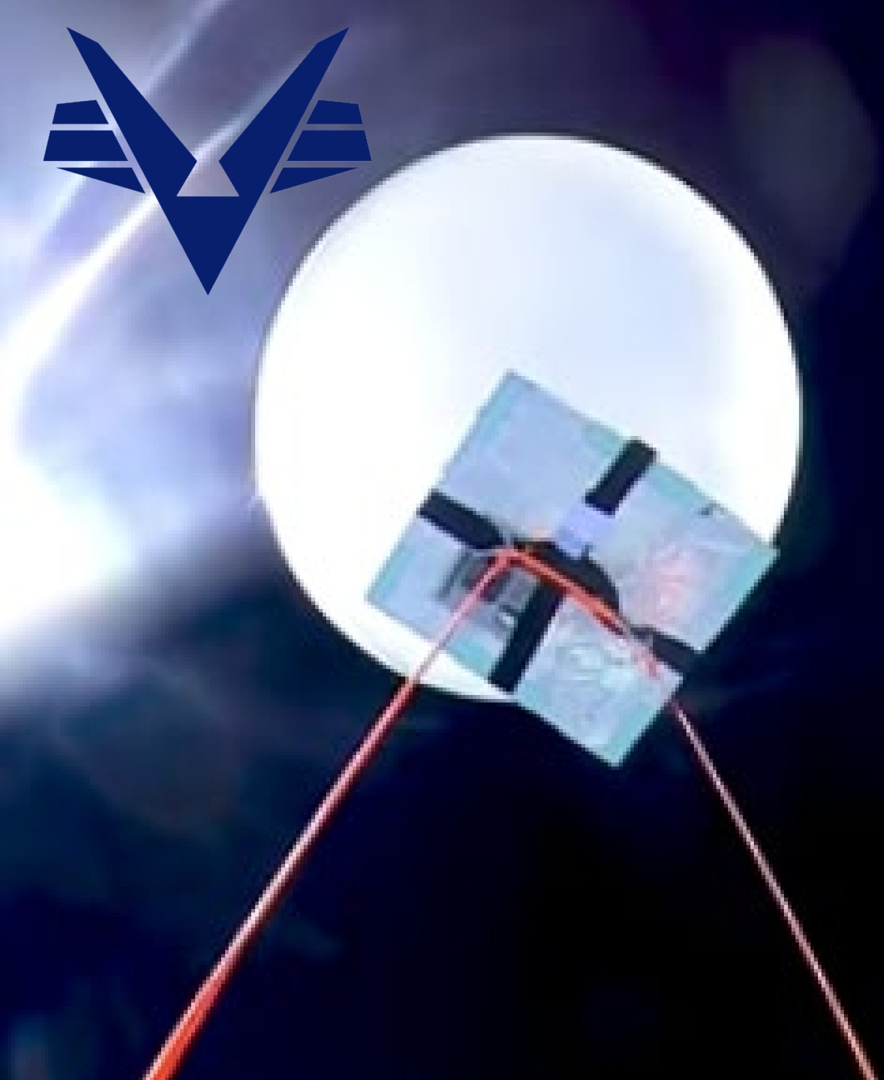
Pre-launch Video Finalists: $100 Grants

NCR-MN-131 Ft Snelling Cadet Squadron

**GLR-OH-131 Cuyahoga County Blacksheep Cadet Squadron

Pre-launch
Video Winner:
$300 Grant

MAR-NC-048
Raleigh-Wake
Composite Squadron



Science Slide Category: includes experiment results, research, and relevance

Science Slide Finalist- $200 Grant

**GLR-OH-131 Cuyahoga County Cadet Squadron

The Effects of High-Altitude Atmospheric Conditions on Batteries

Launch Date: 13 Aug, 2022
Maximum Altitude: 98,663 ft
Flight Duration: 1hr 53 min

GLR-OH-131 Cuyahoga County Cadet Squadron, Brecksville, OH

CIVIL AIR PATROL
AEROSPACE EDUCATION

Background

SPACE… the final frontier !! With the latest NASA focus on sending humans to the moon and Mars, the Artemis and Gateway programs, Space has recaptured our imagination and attention.
In our orientation session, we learned about the layers of the atmosphere, especially the **Stratosphere**[3], the destination of our experimental payload in the balloon.
The stratosphere is very similar to the surface of Mars.
With extreme temperatures, high ozone levels, low pressure and oxygen levels it is hazardous to human health as well as to the equipment needed for space travel.
Just as we use **batteries** in everything from calculators to cell phones here on earth, we also need to use batteries for space travel. Batteries[5] are an integral part of our quest to understand space, from travel to living in the outposts of moon and mars !!

Hypothesis

Our hypothesis is that environmental conditions in space and Mars, such as radiation, temperature, pressure, humidity and VOC gases will affect the performance of batteries negatively.

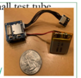
Our plan is to send various types of batteries[1] in our payload and test the effectiveness of the batteries using voltage. We will also measure the above environmental conditions as the balloon travels into the stratosphere.

Methods & Materials

- To test our hypothesis, we sent a **3.7V Lithium-Polymer, a 3V Lithium coin CR2032 and a 1.5V Alkaline AAA** battery in our payload and the same for the control.
- We researched[1] ways to measure the environmental conditions that will fit in our **50-milliliter test tubes**.
- We built an electronic circuit with a **microprocessor** and sensors to measure and record temperature, pressure, humidity and Volatile Organic Compounds commonly known as VOCs, as well as altitude[4].
- **Tiny Circuits**, an Akron based company, graciously donated their TinyDuino[8] modules. We assembled the **Arduino** board, and added an SD card module to record data, a temperature-pressure-humidity-altitude-VOC electronic **sensor** board, all powered by a 3.7V Li-Po battery, which fits into the small test tube.

3 Types of batteries

Tinyduino
+ SD module
+ Protoboard
+ Environmental Sensor
+ 150 mAh LiPo battery



Payload inside the test tube for launch (and control)

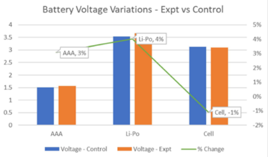
Procedures

- We programmed the Arduino board using the **Arduino IDE** to start recording sensors and altitude data every minute and writing to a file on the SD card.
- We instructed the CAP launch team to turn on the power switch before launch and turn it off once done.
- We then downloaded the data into **Excel**, and along with data from the launch company Near Space Education (NSE) and plotted the graphs and analysis.
- We measured the **voltages** of the batteries in the Control and the Experiment using a **multi-meter** and then graphed them in Microsoft Excel.

Results

- In the Alkaline AAA battery, we saw a voltage increase of 3% in the Experiment compared to the control.
- In the LiPo battery, we saw a voltage increase of 4% in the Experiment compared to the control.
- In the Lithium Coin-cell, we saw a voltage decrease of 1% in the Experiment compared to the control.

Battery Type	Voltage - Control	Voltage - Expt	% Change
AAA	1.515	1.5615	3%
Li-Po	3.527	3.669	4%
Cell	3.133	3.099	-1%



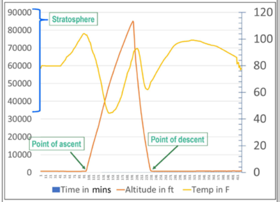
Sampling of the dataset used for Analysis, as recorded from the sensors

Time in secs	Altitude in ft	Temperature in C	Temp in F	Pressure - Hpa	Altitude - m	Humidity	VOC - Kohms
201	53894.35704	33.89	93.002	87.13	16427	9.02	24.43
202	51198.22842	33.67	92.606	101.54	15605.22	7.93	27.21
203	48470.99745	33.28	91.904	118.01	14773.96	7.25	30.30
204	45943.53682	32.62	90.716	135.38	14003.59	6.39	33.88
205	43318.63524	31.7	89.06	155.14	13203.52	5.91	38.24
206	40742.94626	30.69	87.242	177.01	12418.45	5.57	42.63
207	38232.02106	29.63	85.334	200.65	11653.12	5.4	47.17
208	35849.47512	28.39	83.102	225.5	10926.92	5.24	51.75
209	33697.34257	27.03	80.654	250.21	10270.95	5.32	56.49
210	31676.50923	25.7	78.26	275.17	9655	5.5	60.88
211	29644.61947	24.39	75.902	302.03	9035.68	5.66	65.49
212	27638.54991	23.07	73.526	330.68	8424.23	5.78	69.31
213	25693.07747	21.76	71.168	360.58	7831.25	6.29	73.73
214	23743.73363	20.5	68.9	392.6	7237.09	6.97	77.23
215	21895.30843	19.47	67.046	425.31	6673.69	8.14	79.90
216	20149.83599	18.73	65.714	458.17	6141.67	9.17	82.44
217	18499.67194	18.05	64.49	491.1	5638.7	10.35	84.70
218	16877.32942	17.43	63.374	525.11	5144.21	12.54	85.40
219	15256.59451	17.12	62.816	560.92	4650.21	14.82	85.75
220	13630.11813	16.99	62.582	598.75	4154.46	16.85	86.38
221	12011.02364	16.87	62.366	638.52	3660.96	19.05	87.19
222	10394.94752	16.74	62.132	680.34	3168.38	21.3	88.21
223	8868.996076	16.76	62.168	722.14	2703.27	22.83	88.97
224	7375.820221	16.96	62.528	764.81	2248.15	23.5	89.16

Data Analysis

- Our built-in sensor measured altitude during the launch. We did not find altitude data from the NSE data to corelate it to our dataset.
- From our data, as shown below by the Point of Ascent and Point of descent, we can tell that the balloon started rising at around 94 minutes after our sensors were turned on, and came down after around 138 minutes, or roughly 2 hours and 18 mins.

Graph of Altitude in ft (y1 axis), Temperature in F (y2 axis) vs Time in mins



Data Analysis and Inferences

1. We see from the graph above of **Altitude and Temperature vs Time,** that as the balloon was rising, the temperature dropped at around 33000 ft, and then started increasing until the balloon started descending around 70000 ft. **This proves that temperatures rise in the Stratosphere**, as shown above.
2. Once the payload landed, the temperature once again started to rise, due to the ambient temperature, which is around 80 degrees, verified from a weather website.
3. **The amount of time** that the batteries were exposed in the stratosphere was around **90 minutes**, from our graph. This does not seem to be adequate Radiation exposure for it to have a significant effect on the battery capacity.
4. We see that the **temperature** of the experiment exposure **swung widely** from 80 to 100 degrees and then down to 44 degrees, then back up to 100 and down to 62 and then closer to 100 degrees. **This wide fluctuation seems to have affected the batteries differently, and mostly showed an increased voltages with increase in temperatures.**
5. We are assuming that the **control was not exposed to these fluctuating temperatures** and probably in an air-conditioned room near ambient temperature of around 77 degrees.

Inferences from the data

5. The effect on coin-cell batteries, with the **largest metallic surface area** showed a decreased voltage in our experiment, probably coinciding with heat dissipation happening more quickly. And coin-cell are **Lithium based** batteries and this could have contributed to the decrease in voltage as well.
6. One research paper[1] on Battery Technology in CubeSats and Small Satellite solutions showed that the chief characteristics affecting battery life is **extreme temperatures and rate of change, space radiation, vibration and shocks**. With this balloon challenge, the main area we could focus on was the temperature fluctuations, although they are not as significant as in outer space or in Low earth orbit.

Conclusion

Unfortunately, our hypothesis could not be validated at this time with our current experimental setup.
We think that the short window of time for exposure to radiation or extreme temperature fluctuations during the balloon launch is not enough to draw any strong conclusions on our experiment.

Impact and Possible Improvements

The importance **of understanding the environmental factors affecting battery life** in space and Mars is critical to the success of our future missions.
We believe that instead of measuring and comparing voltages before and after launch, we would like to use a **live circuit that is constantly measuring voltage and current** during the experiment. That would be the best improvement for our next launch with a balloon.
We believe that maybe a **prolonged exposure** to these adverse conditions over a period of **months** such as in a **CUBESAT**[5] might prove our hypothesis to be correct.

References

1. Knap V, Vestergaard LK, Stroe D-I. A Review of Battery Technology in CubeSats and Small Satellite Solutions. Energies. 2020; 13(16):4097. https://doi.org/10.3390/en13164097
2. M. Cortés-Carmona, A. Mallco-Mallco, R. Palma-Behnke, W. Calderón-Muñoz and J. Reyes-Marambio, "Altitude effect in the design of a lithium-ion battery packing system," 2017 CHILEAN Conference on Electrical, Electronics Engineering, Information and Communication Technologies (CHILECON), 2017, pp. 1-7, doi: 10.1109/CHILECON.2017.8229556.
3. The Stratosphere: https://scied.ucar.edu/learning-zone/atmosphere/stratosphere
4. Does Altitude Affect Batteries On Earth https://www.upsbatterycenter.com/blog/does-altitude-affect-batteries-on-earth/
5. Batteries on Mars that Provide Power : https://www.upsbatterycenter.com/blog/batteries-on-mars/
6. NASA CubeSat Launch Initiative: https://www.nasa.gov/content/about-cubesat-launch-initiative
7. https://www.windows2universe.org/earth/Atmosphere/stratosphere_temperature.html
8. Using the Audio TinyShield:Tutorial: https://tinycircuits.com/blogs/learn/124335431-using-the-audio-tinyshield-tutorial

Science Slide Finalist- $200 Grant

**NER-MA-007 Goddard Cadet Squadron

Objective: **To determine whether or not the extreme low temperature in the stratosphere will decrease the adhesiveness of Dermabond Topical Skin Adhesive™.**

Balloon 1
Launch
08/13/22
Peak Altitude
98,663 feet

Hypothesis

Dermabond™ is used to join two skin edges together, decreasing the risk of wound infection. Our hypothesis is that the extreme low temperature will impair the adhesive properties of this product.

Background Research

Cold temperature is known to affect the viscosity of adhesive products. Thickening of adhesives decreases the ability of these products to hold two surfaces together.[1] Dermabond™ Topical Skin Adhesive is designed to hold human skin edges together.[2]

Materials

Capsule
Dermabond™ Topical Skin Adhesive with Applicator
2 FILA medium-strength circular exercise band (4.5 cm width)
Metal stand with two bars spaced 34 cm apart
Pony 1-inch plastic tip spring clamps
X-Acto knife/Twine/Canon EOS Rebel T6
Plastic oval bucket with a handle on either end
Mixed coins: pennies, nickels, dimes quarters
Plastic weights: 2.5-lb, 5 lb, and 8 lb weights

Testing Method & Procedures

A 2-cm linear slice (incision) was made parallel to the length of the exercise band, centered along the length and width of the band.

After pulling the 2 sides of the slice together, a thin layer of Dermabond™ was applied along the slice and allowed to dry for 20 seconds. This procedure was repeated. Then, a third and thicker layer of Dermabond ™was applied and allowed to dry for 20 minutes.

A clamp was then applied on each side of the incision, spaced 2 cm away from the edge of the incision. Acting as a pulley, twine was extended from each clamp, across a metal bar, and attached to the plastic bucket below the incision (see image to the left).

Coins and weights were added to the bucket until edges of the incision tore apart (see image to the near right).

Results

Flight Sample: : 4 lbs 9.7 oz added to bucket: no effect;, then 2.5 lb weight added: no effect; then 2.5 lb weight added: small pinhole tear; then 8.0 lb weight added and the incision tore apart (see image to the far right). **Control Sample:** the same incremental weights were added in the same order with no effect on the incision. We stopped at that point as the bucket was about to tip.

Conclusions & Implications

The results of this experiment support our hypothesis. The adhesive strength of Dermabond™ Topical Skin Adhesive was decreased in the flight sample when compared to that of the control. Cold temperature is known to affect the viscosity of adhesive products,[1] and this was demonstrated in this experiment.

Dermabond™ is used for superficial, linear cuts. If a space traveler gets a skin cut, this product may not be effective. Having an open wound increases the risk of skin infection.

One way to improve this experiment would be to use smaller 1-lb weights and a larger bucket.

[1] Johns Manville. (n.d.). (rep.). *Cold Temperature Research Results for Adhesives.* Retrieved September 16, 2022, from https://www.jm.com/content/dam/jm/global/en/commercial-roofing/Resources/LVOC%20and%20Solvent%20Adhesive%20in%20Cold%20Weather.pdf.

[2] Bruns, T. B., & Worthington, J. M. (2000). (rep.). *Using Tissue Adhesive for Wound Repair: A Practical Guide to Dermabond.* American Family Physician. 2000;61(5):1383-1388. Retrieved September 16, 2022, from https://www.aafp.org/pubs/afp/issues/2000/0301/p1383.html.

Science Slide Finalist- $200 Grant

SER-AL-119 Redstone Composite Squadron

Micro SD Card

Redstone Composite Squadron AL-119

Hypothesis- The files will be distorted,not enough to be visible, but the SHA256 will be different.

- Testing Method- Pulling the SHA256 from the files pre and post flight.
- Materials- Micro SD, Computer

Results- The SHA-256 of each file are the same, meaning that the files did not change.

The absence of change is bad for our hypothesis, but good for the rest of the world, as it means technology will not be manipulated by the atmosphere (or lack thereof) when we launch aircraft into space.

File 1
Pre-Flight:
C5D03674E64EEAA9D8BD76C3E1B74281318D8933EAEC8D37D4770AE649B6C7A0
Post-Flight:
C5D03674E64EEAA9D8BD76C3E1B74281318D8933EAEC8D37D4770AE649B6C7A0

File 2
Pre-Flight:
516B8F95E51FA73908FDB973BF9C51B694DE740A9AB9A50DD4E0D6E689D73D31
Post-Flight:
516B8F95E51FA73908FDB973BF9C51B694DE740A9AB9A50DD4E0D6E689D73D31

File 3
Pre-Flight:
66A2F70EBED12A2ACB70504B2F62CCDDE3250C9703F5A390148BA8DCD07E8E8D
Post-Flight:
66A2F70EBED12A2ACB70504B2F62CCDDE3250C9703F5A390148BA8DCD07E8E8D

File 4
Pre-Flight:
188E2524AE001B4A85E286EAF179B97828F3B247937014D242BB256ED66B70F6
Post-Flight:
188E2524AE001B4A85E286EAF179B97828F3B247937014D242BB256ED66B70F6

Science Slide Finalist- $200 Grant

NCR-MO-127 Trail of Tears Composite Squadron

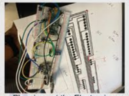
CIVIL AIR PATROL
U.S. AIR FORCE AUXILIARY

Measuring Magnetic Field, Air temperature, Pressure At High Altitude

C/SrA Harris, C/MSgt Ragain, C/SrA Kuntze, C/A1C Gers, and C/A1C Jones
NCR-MO-127 Trail of Tears Composite Squadron

TRAIL OF TEARS 23127 CIVIL AIR PATROL


HABC Team at SEMO
Source: HABC Team


Planning out the Electronic Connections
Source: HABC Team


C/SrA Harris Explaining Project to Dr. Vargas, SEMO President
Source: HABC Team

Hypothesis/Objective

- Objective: Measure magnetic strength, air temperature and pressure at high altitude and compare to a control
- Hypothesis: We'd be able to observe changes in magnetic pressure and that we could correlate the changes to altitude using pressure.

Materials

- 50 mL centrifuge tube with lid
- Adafruit 4479 Triple-axis magnetometer
- TMP36 Temperature sensor Pressure sensor
- Barometric pressure sensor
- A23 Battery
- Electrical board
- Electrical Wires
- On/off switch
- Arduino Nano
- Part of a rubber glove

Experiment in 50mL Tube
Source: HABC Team

Testing

- Sensors and Desired Measurements
  - An Adafruit 4479 Triple-axis magnetometer was used to measure magnetic field
  - A TMP36 Temperature sensor was used to measure temperature
  - A barometric pressure sensor was used to measure pressure
- Pre-launch testing
  - During the construction phase the code and sensor were tested by taking room temperature, pressure, and magnetization date
  - Device, code, and data collection worked as designed in final product
- Post-launch trouble shooting
  - It was noted that he wires attaching the on/off switch to device had come discounted when trying to access the micro-SD card to download experimental data
  - Theory that tightening of the lid caused the wires to disconnect was tested by resoldiering the connections and tightening turning the lid

Results

- Mission Data (Source CAP HABC Page)
  - Peak Alt: 99962ft
  - Vertical Speed:4.763m/s
  - Launch Date: Aug 13, 2022
- SD Data
  - No data was recovered from the micro-SD card on the flight or control experiment
- Equipment Data
  - The wires were observed to be disconnected from on/off switch on both devices


Balloon 2 Flight Path
Source: CAP HABC Page


Experiment Wires Disconnected from On/Off Switch
Source: HABC Team

Analysis of Results

Objective: We were unable to meet our objective due to the wiring of the on/off switch coming unattached

Hypothesis: We were unable to prove or disprove our hypothesis due to the wiring of the on/off switch coming unattached completion and launch

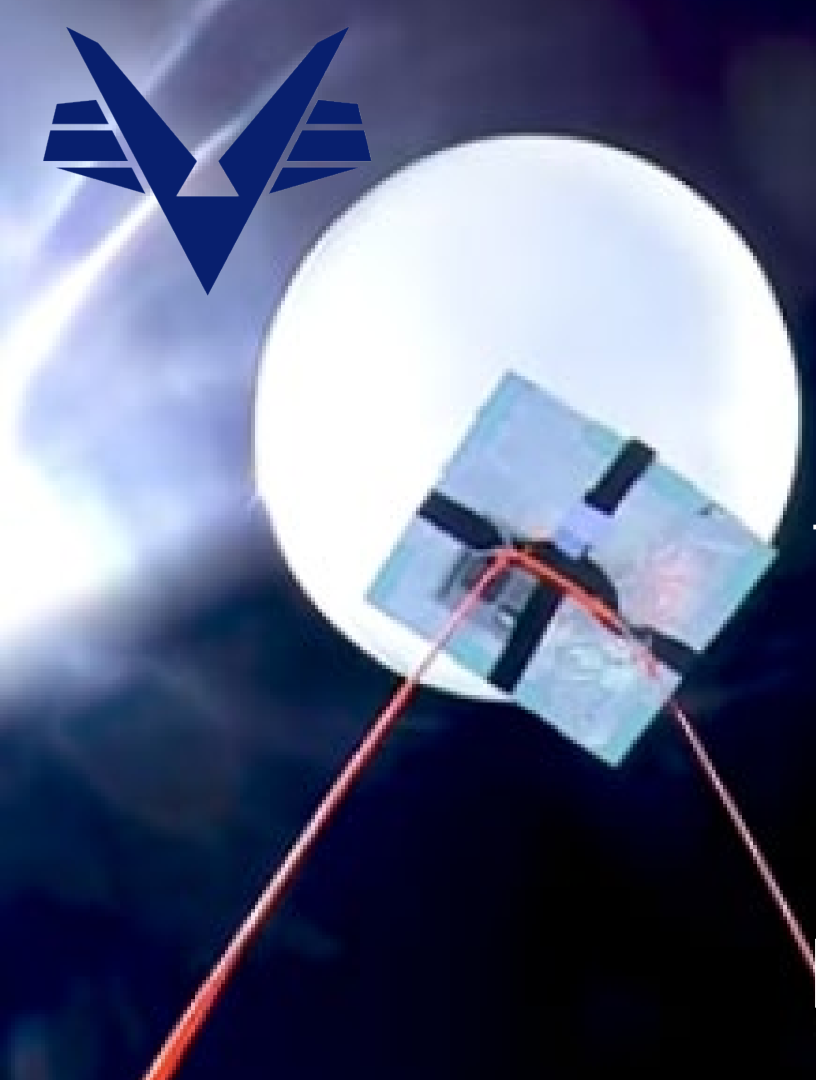
Conclusions

- Lessons Learned
  - Provide better instructions
  - Attach lid physically to prevent turning
- Future Directions
  - Repair electronics
  - Launch in wing repeater plane
  - Discussions with Southeast Missouri State University about local High Altitude Balloon challenge

Acknowledgements

- Trail of Tears Composite Squadron Members
- Senior Member Advisors: Dr./Cap-Capt. Christina Ragain, SM Cara Kuntze, SM Jeanne Harris
- Southeast Missouri State University: Dr. Joe Murphy, Dr. Jonathan Kessler, Dr. Brad Deken, Mr. Scott Wright
- Nestle: Mr. Keith Harris, Mr. Mark Weeks


Squadron Cadets
Source: HABC Team



Documentary Video Category

-shares project info from beginning to end with plan for use if Kittinger cash prize and Cup was won

Click on each team patch to view the video.

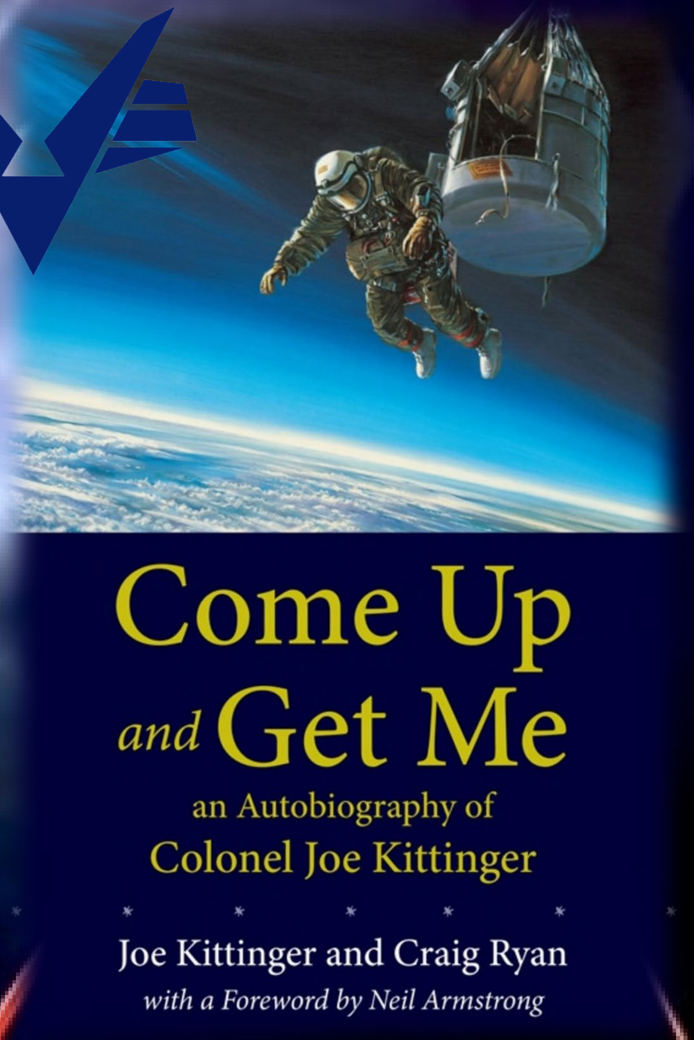
Documentary Finalists: $300 Grants

MAR-WV-114 Potomac Highlands Composite Squadron

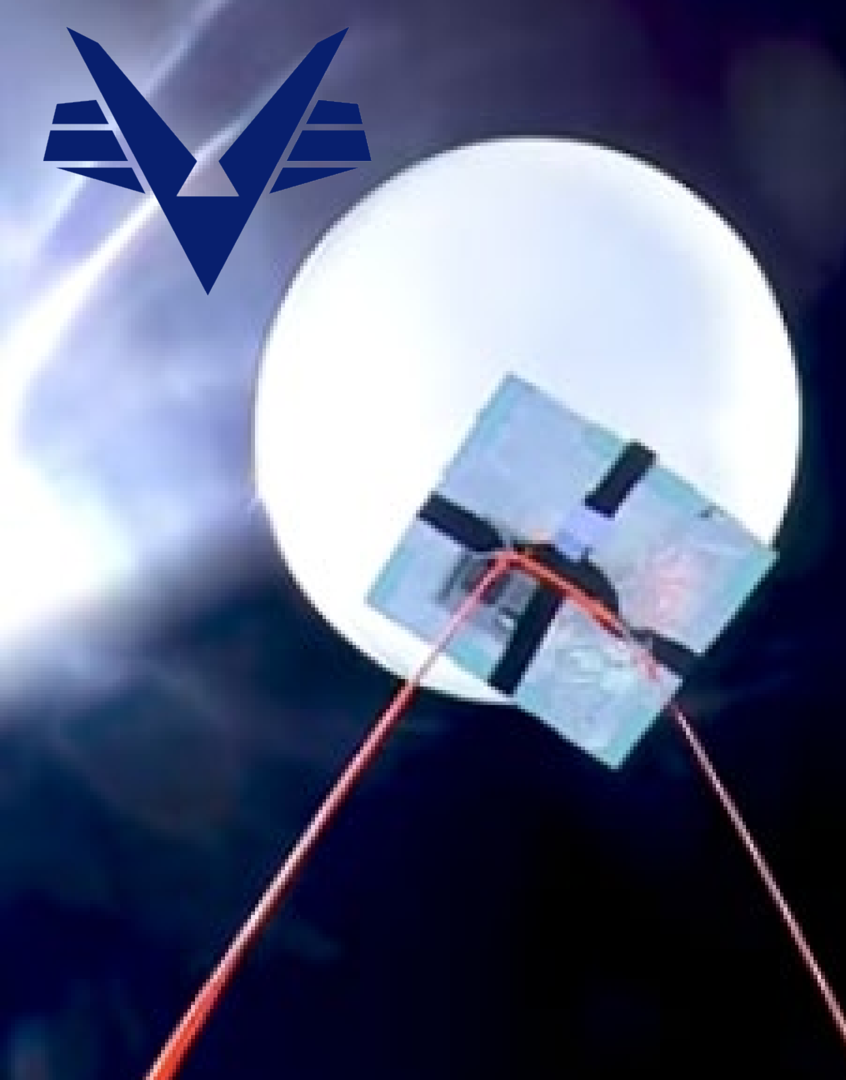
GLR-IN-036 Valparaiso Composite Squadron

Documentary Winner: $500 Grant

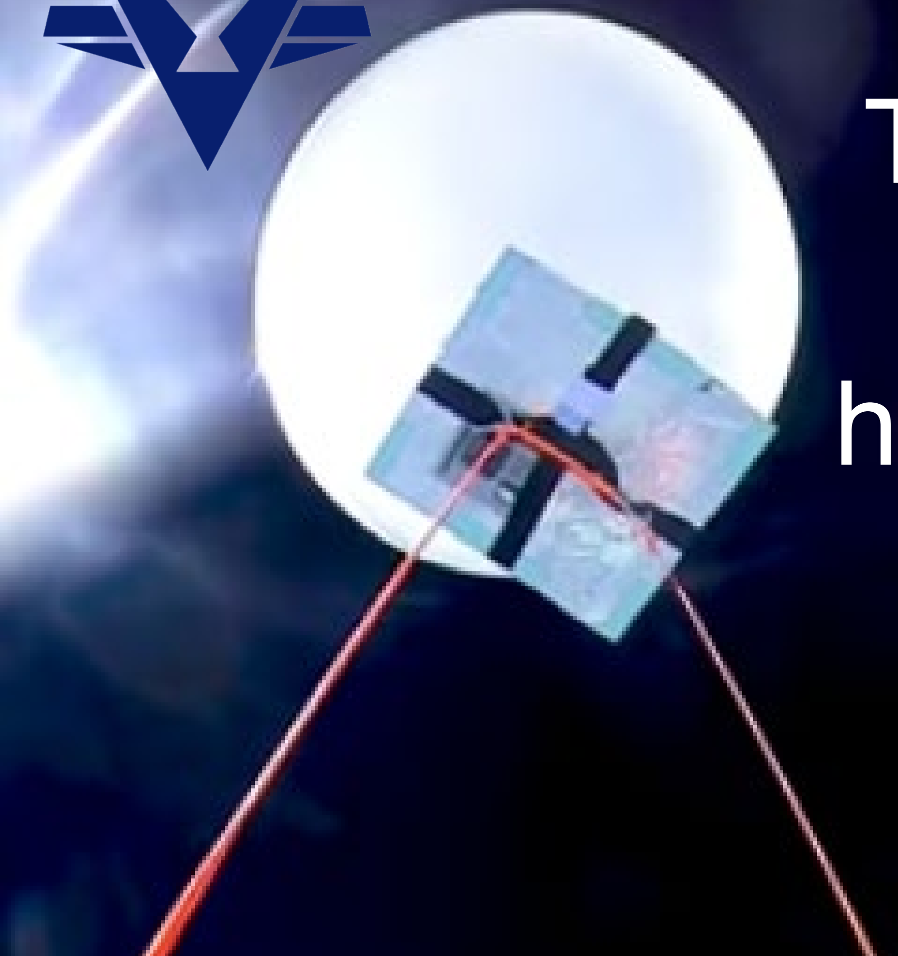
MAR-DE-020
North Chesapeake Cadet Squadron



Finally,
the four finalists ---
and the announcement
of the winner of the
2022 Kittinger Cup
and
$5,000 cash prize and
autographed books from
Col Joe Kittinger...

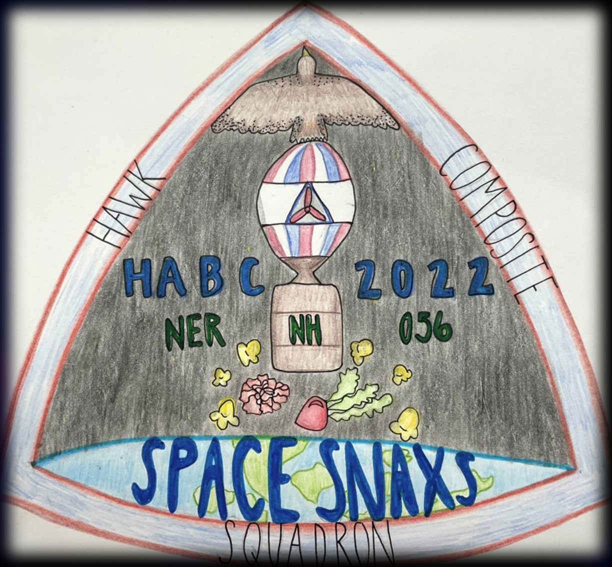


Note: If any Kittinger Cup finalist was also a winner in another category, the finalist will only receive the finalist grant prize.



The Kittinger Cup finalists with the highest cumulative scores are….

Kittinger Cup
4th Runner Up:
$300 Grant



NER-NH-056
Hawk Composite Squadron

Kittinger Cup
3rd Runner Up:
$400 Grant

SWR-AZ-210
Show Low Squadron 210

Kittinger Cup
2nd Runner Up:
$500 Grant

NER-MA-007
Goddard Cadet Squadron

Kittinger Cup
1st Runner Up:
$600 Grant

GLR-OH-131
Cuyahoga County
Blacksheep Cadet Squadron

Announcing the
2022 Col Joe Kittinger Cup
and presenting Col Kittinger's
2022
National CAP Brewer Award

CAP's National Commander
and CEO,

Maj Gen Edward Phelka
HERE

Kittinger Cup Winner & $5,000 from Col Kittinger

MAR-VA-007

William P. Knight Composite Squadron

Kittinger Cup Winner’s Science Slide with QR Code for Additional Information

Accuracy of Blood Glucose Test Strips In Space

Testable Question:
How do the high-altitude atmospheric conditions affect the results of blood glucose test strips?

Hypothesis:
The biological enzyme from the test strips from the flight capsule will denature due to the high-altitude atmosphere and the readings will be inaccurate.

Hypothesis is supported by data: No
Inconclusive. We were unable to confirm our hypothesis because the control capsule was introduced to other variables (e.g.,light, X-ray) which compromised the integrity of the experiment.

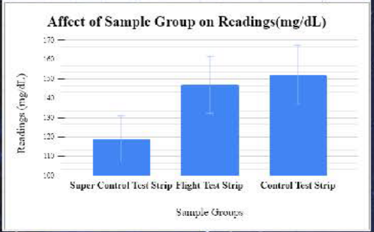
How would you improve your experiment?
We would place our test strips in the original manufacturing capsules as pictured to the right that would help prevent exposure to direct light, radiation, and disturbance that would alter the control. The test strip container would need to have a diameter less than 1.2 inches so it would fit in the capsule.

Control vs Flight Test Strip Readings		
Test Strip #	Control Test Strip Reading	Flight test Strip Reading
1	142	144
2	154	Error 4*
3	170	147
4	164	157
5	178	151
6	Error 4*	145
7	138	138
8	140	145
9	144	152
10	139	143
Average	152.11	146.88

* The test strip may have been damaged

Super Control test Strip Reading	
Test Strip#	Super Control Test Strip Reading
1	119
2	121
3	120
4	119
5	121
6	120
7	118
8	119
9	120
10	120
Average	119.7

To test the accuracy of the test strips, we used a glucose control solution with a control range from 102-138 mg/dL with a mean of 120 mg/dL. The 10 test strips from the control capsule had an average of 152.11mg/dL and the flight test strip capsule had an average of 146.88 mg/dL. Since these numbers were not in the control strip range, we concluded that the control test strips were compromised. Thus, we introduced a “super control” group where we tested 10 additional test strips stored in the original manufacturing test strip bottle, which returned an average of 119.7 mg/dL, which is consistent with the glucose control solution projected mean of 120 mg/dL.



Squadron Charter/ Name: MAR-VA-007
William P. Knight Composite Squadron
Launch Date:13 Aug 22, 09:31 EDT
Team Number: Balloon 1
Maximum Altitude: 99,962 ft
Flight Duration: 4 hrs 01 minute

Materials Used: OneTouch Verio Flex Blood Glucose Monitoring System, OneTouch Verio Test Strips, OneTouch Verio Control Solution Level #3 (Mid) for Blood Glucose Meters

Mission Patch

Congratulations, MAR-VA-007!

See their winning documentary video HERE.

2022 Kittinger Cup winners share appreciation to Col Kittinger in a video HERE. Go Knights!

MAR-VA-007 Team

Cadet Team Members:
C/Capt Katherine Chung-Ting Ku
C/Capt Sarah Sitoula
C/Lt Rachel Chung-Chi Ku
C/CMSgt Alisha Sitoula
C/CMSgt Megan Ajay Sawant
C CMSgt Neel AjaySawant
C/TSgt Thomas Ye
C/SRA Daniel Berberian

Squadron Commander:
Lt Les Flores

Adult Team Mentors:
Capt Ajay Sawant, AEO
Lt Navin Sitoula

Special appreciation to the Air & Space Forces Association (AFA) Aerospace Education Council for their generous support with CAP squadron grant funds.

AFA
Aerospace Education Programs

AFA
AIR & SPACE FORCES ASSOCIATION

Tribute to
Col Joe Kittinger:

For his inspiration and challenge to CAP's cadets to learn more about space science, CAP will be forever honored and appreciative.

"We're at 103,000 feet…
As you look up, the sky looks beautiful, but hostile.
As you sit here, you realize that Man will never conquer space.
He will learn to live with it, but he will never conquer it."

~Joseph Kittinger

Thanks to all cadet teams for participating in the 2022 HAB Challenge. Please join the program again next year!

Click HERE to view the entire video awards program

CIVIL AIR PATROL
U.S. AIR FORCE AUXILIARY