



STAR

Established in 2015, Space Technologies and Rocketry at Berkeley (STAR) is the largest undergraduate aerospace organization on campus. Our mission is to become a world-class student rocketry organization and send rockets to space!

***2023-2024 Organization Info and Sponsorship
Opportunities***

OUR AMBITIONS



COMPETITION

Competed in NASA SL, and currently competing in IREC (Intercollegiate Rocketry and Engineering Competition)



EDUCATION

Prepare and educate members through introductory programs and hands-on workshops for industry.



OUTREACH

Partner with companies and organizations from various industries, and serve the community through philanthropic events.

1

URSA Minor

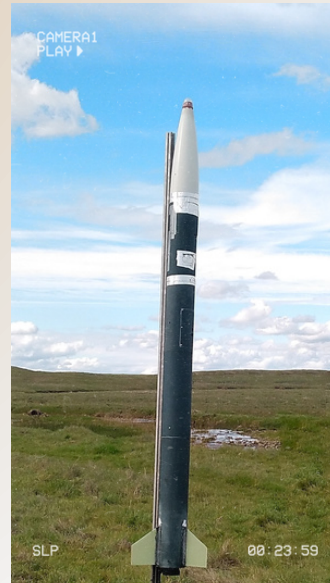
Year: 2016
Outcome: Altitude:
4633 ft/1412 m



2

URSA Major

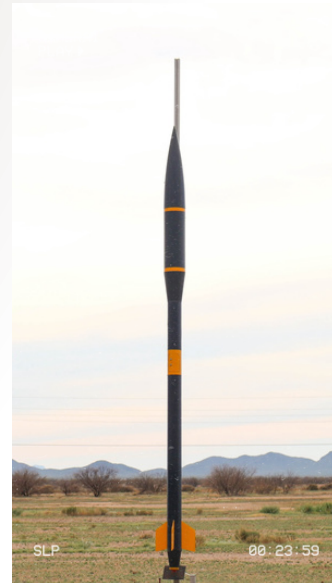
Year: 2017
Outcome: Altitude:
4530 ft/1380 m



3

Arktos

Year: 2018
Outcome: Altitude:
5362 ft/1634 m



4

Airbears

Year: 2019
Outcome: Altitude:
7752 ft/2363 m



5

Bear Force One

Year: 2021
Outcome: Altitude:
10163 ft/3098 m



6

ELLIE

Year: 2022
Outcome:
Successful Hot Fire



9

Bearealis

Year: 2023
Outcome: Altitude:
4075



8

CalVisitor

Year: 2023
Outcome: Altitude:
10,023



7

MINDI

Year: 2022
Outcome:
14,325 feet **BROKE RECORD**



Stage Separation

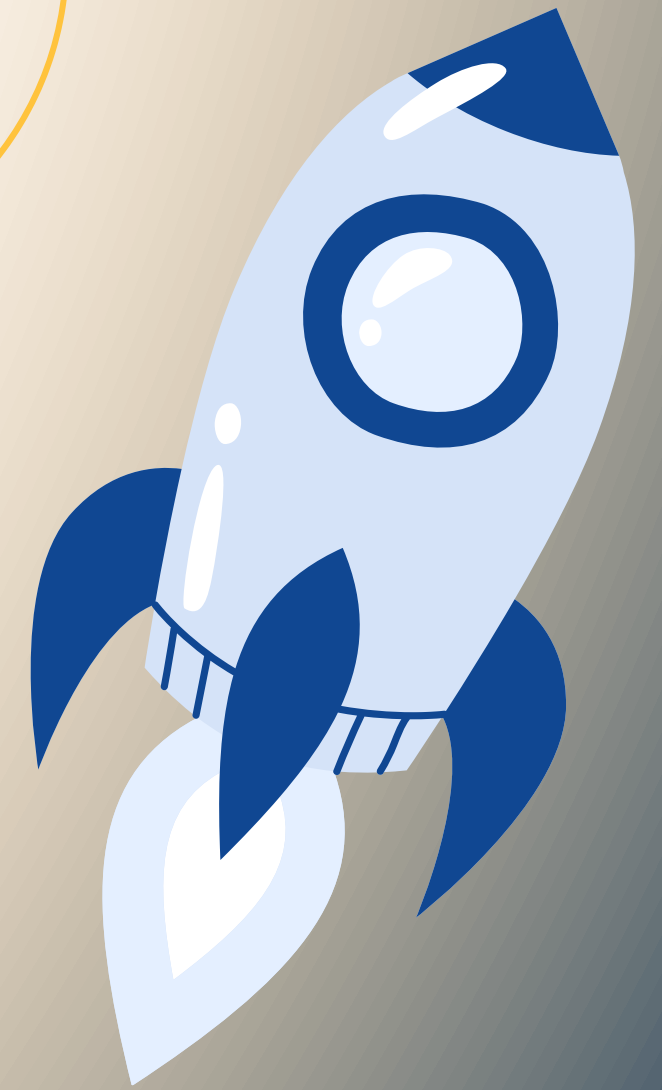
Year: 2022
Outcome:
Successful Staging



EXCELLING

&

EXCEEDING





Calvisitor launch:



OUR ACCOMPLISHMENTS

- 1.** 4th out of 160 teams in IREC 2023 for apogee
- 2.** Won 1st at FAR 2021
- 3.** Currently hold the **university altitude record**
- 4.** Flew Berkeley's first stage separation rocket

THESE ACCOMPLISHMENTS ARE MADE POSSIBLE BY OUR SPONSORS



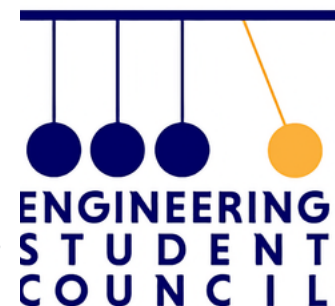
SEAMLESS TANKS



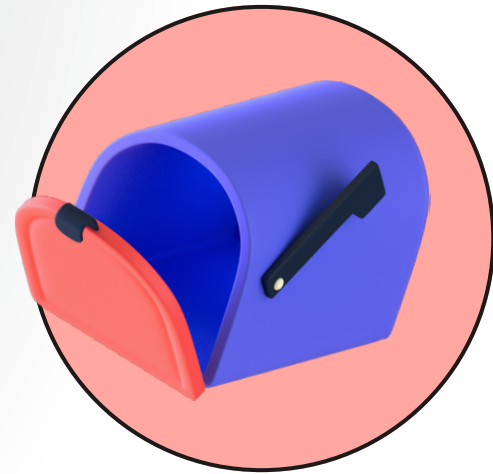
BLUE ORIGIN



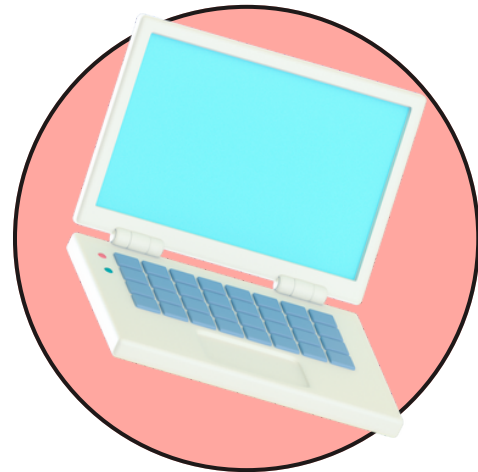
graphit e store
your partner in industrial innovation



Words



From



Members



STAR has impacted my experience at Cal in so many positive ways. I'm a third year deaf and hard of hearing Mechanical Engineering Major who joined Fall 2022, and I have already seen tremendous growth in my technical abilities!

STAR is very conscious of accessibility and they go above and beyond to make sure that I am getting by in the club. All of my inputs are always heard, and members always repeat themselves when I ask them to. Plus, all of the members are AWESOME! I feel like I belong at STAR, and I have no regrets in joining this club.

– Salvador Bravo, B.S. Mechanical Engineering 2024

Even as a psychology student with limited skills in engineering, STAR has allowed me to continue building my media, business, and leadership skills in an energetic and fun environment. Taking on massive ambitions as a club, facing them together, and ultimately succeeding makes me proud to be a part of STAR!

– Saranyu Nel, B.A Psychology 2025

My experience in STAR has enabled me to greatly improve my leadership capability, problem-solving skill, and the ability to work in a team setting. I love being in this collaborative community where we conquer challenges, create solutions, and develop valuable friendships.

– Hubert Liu, B.S Mechanical Engineering 2024

IREC 2023

What was IREC 2023?

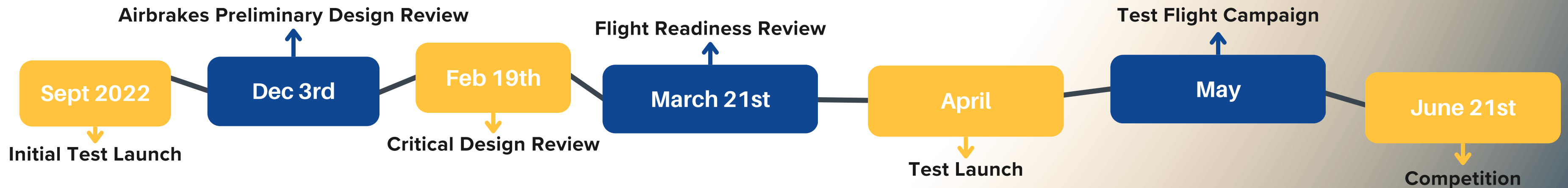
- Our most recent competition
- Intercollegiate Rocket Engineering Competition
- Competed in 10k Commercial-Off-The-Shelf category

Accomplishments

- Reached apogee of 10,023ft **just 23ft from the goal and 4th best in the world**

Impact on STAR

- Focuses on our teamwide core pillar: competition
- Advances team-wide skill set





CURRENT PROJECTS



ALULA

STAR's first liquid bi-propellant rocket, and an extension of our first liquid engine project, ELLIE

Two-stage competition vehicle with a target apogee of 30,000ft for IREC 2024



Caldera



What is Caldera?

- Two-stage competition vehicle with a target apogee of 30,000 feet for IREC 2024

Objectives

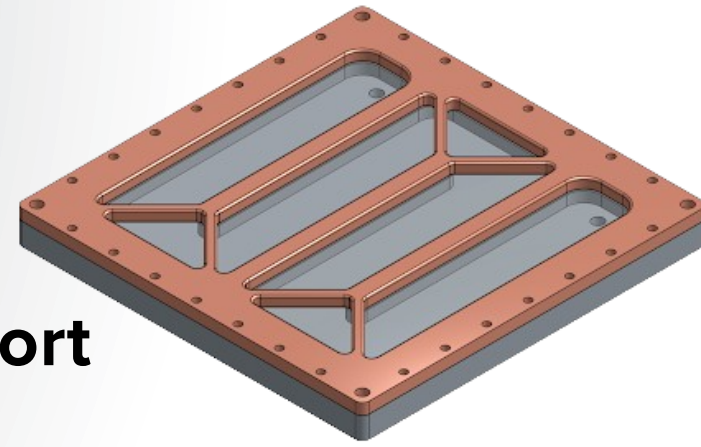
- Investigate a **new staging mechanism** (high altitude black powder, mechanical separation, new & improved pyrobolts) electromagnetic separation)
- **Improved airbrakes** to fine tune apogee
- Flying with Kinetically Engineered Life Support Experiment - Yeast (KELSE-Y) as the IREC payload.
- More rigorous airframe simulations (FEA and aerodynamics) to validate vehicle design choices

Progress (Winter 2023)

- Successful staging of SSEP reflight
- Completed PDR and CDR
- FEA and manufacturing in progress
- Airbrakes, avionics, and payload in active development

CALDERA/IREC 2024

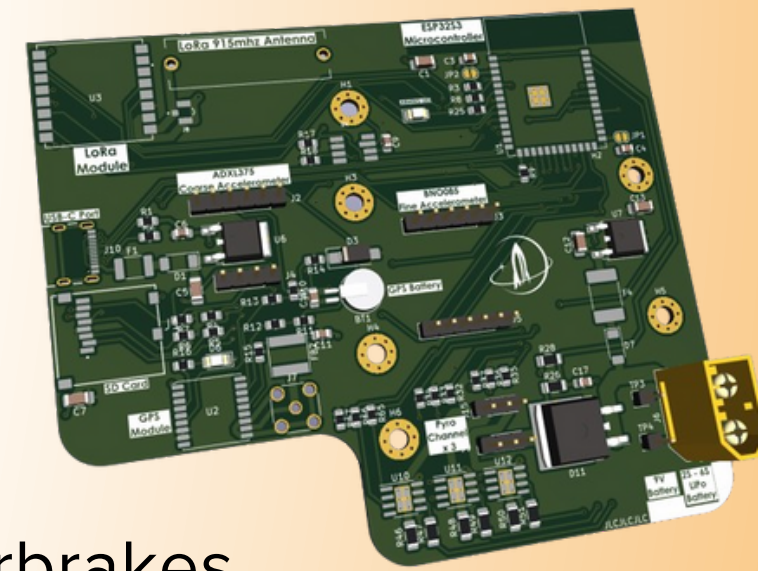
KELSE-Y



Kinetically Engineered Life Support Experiment - Yeast

- Proof of concept for a **life system system to keep a human brain alive during flight**
- Cardiovascular system: Fluidic system moves nutrients to a yeast culture
- Pulmonary system: PDMS membrane to exchange carbon dioxide with the atmosphere
- pH is measured and logged to determine carbon dioxide concentration
- Utilizes a custom PCB to control solenoids and log data
- Designed for a CubeSat form factor

AVIONICS



Custom Flight Computer

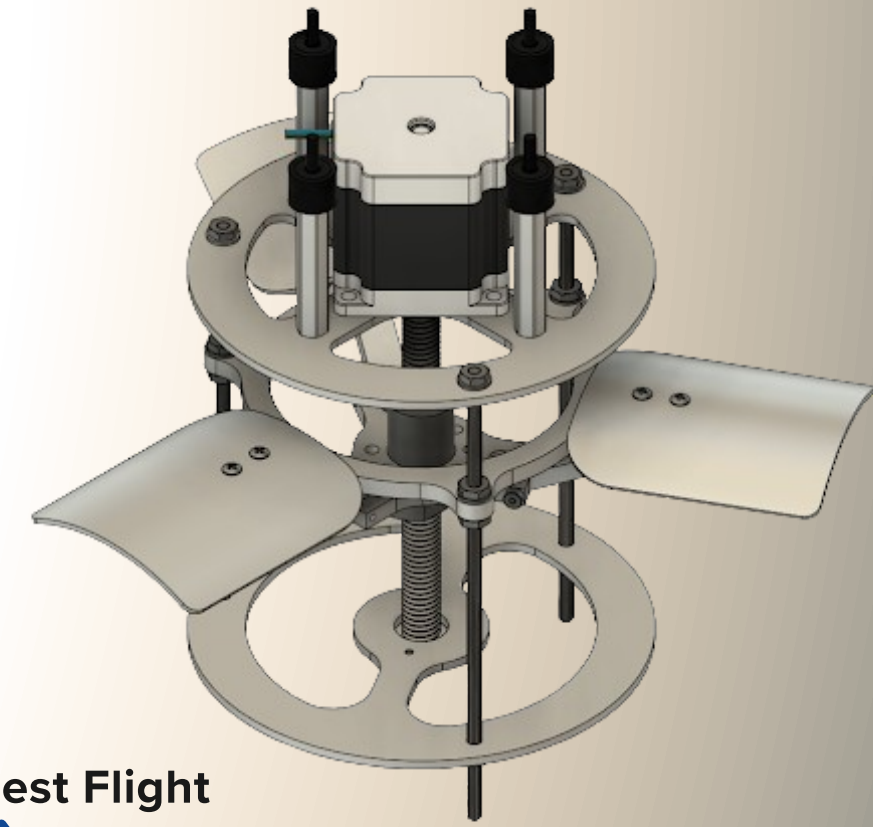
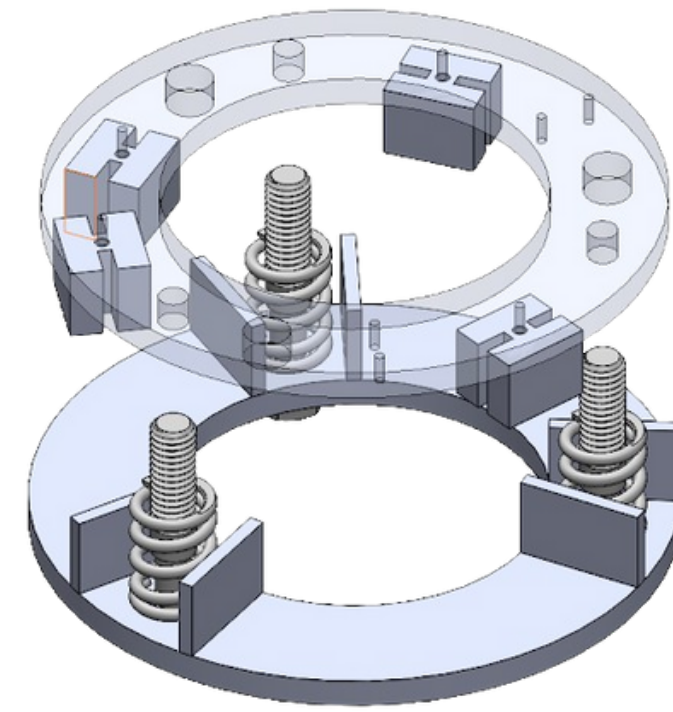
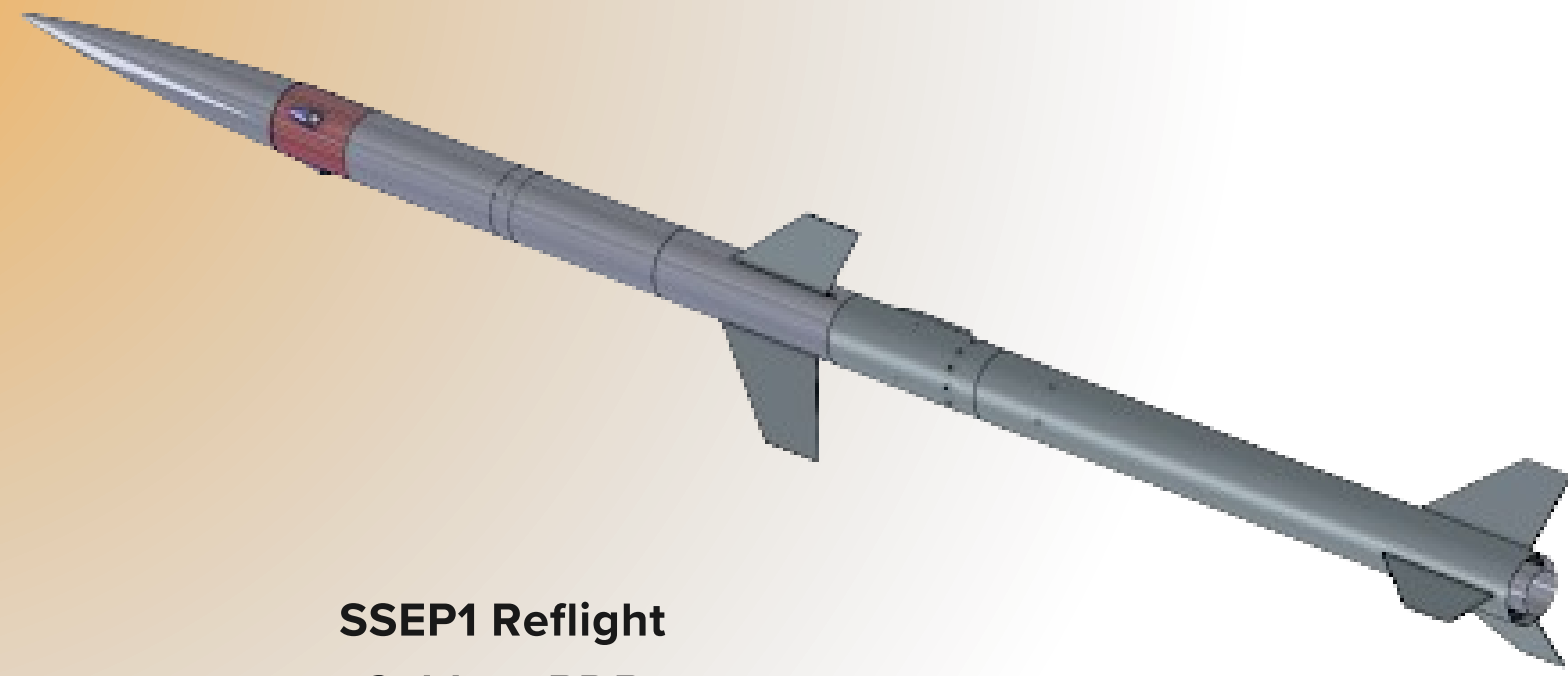
Uses a custom PCB to control airbrakes, successfully tested on two flights

Custom Live Telemetry

Successfully received telemetry data for the duration of a launch for the first time

Live Video Transmission

Working towards live streaming 1080p video from the rocket and pairing it with a overlay of live telemetry



SSEP1 Reflight
Caldera PDR

Preliminary Design Review

Sep 2023

Dec 2023

Caldera CDR

Critical Design Review

Winter 2023

Integration and Manufacturing

March 2024

First Test Flight

Second Test Flight

April 2024

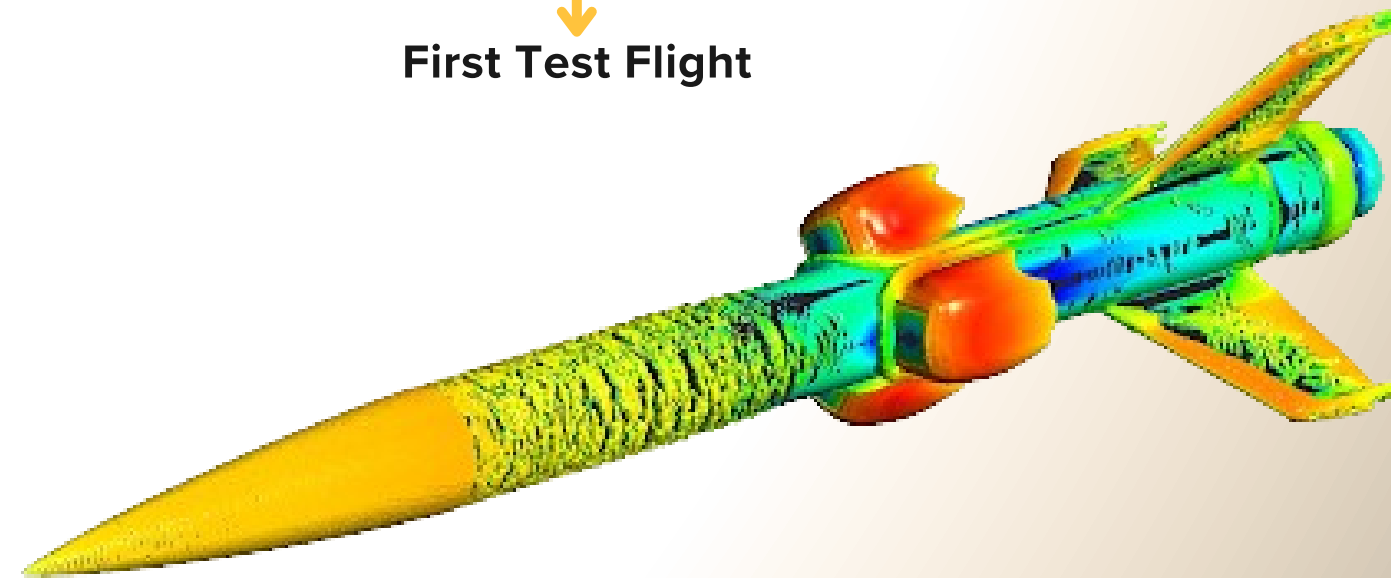
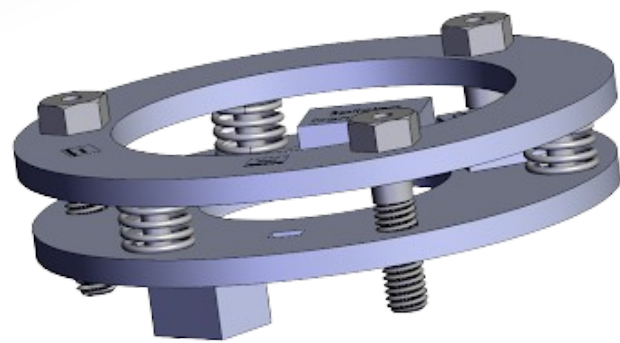
June 17th

Launch!

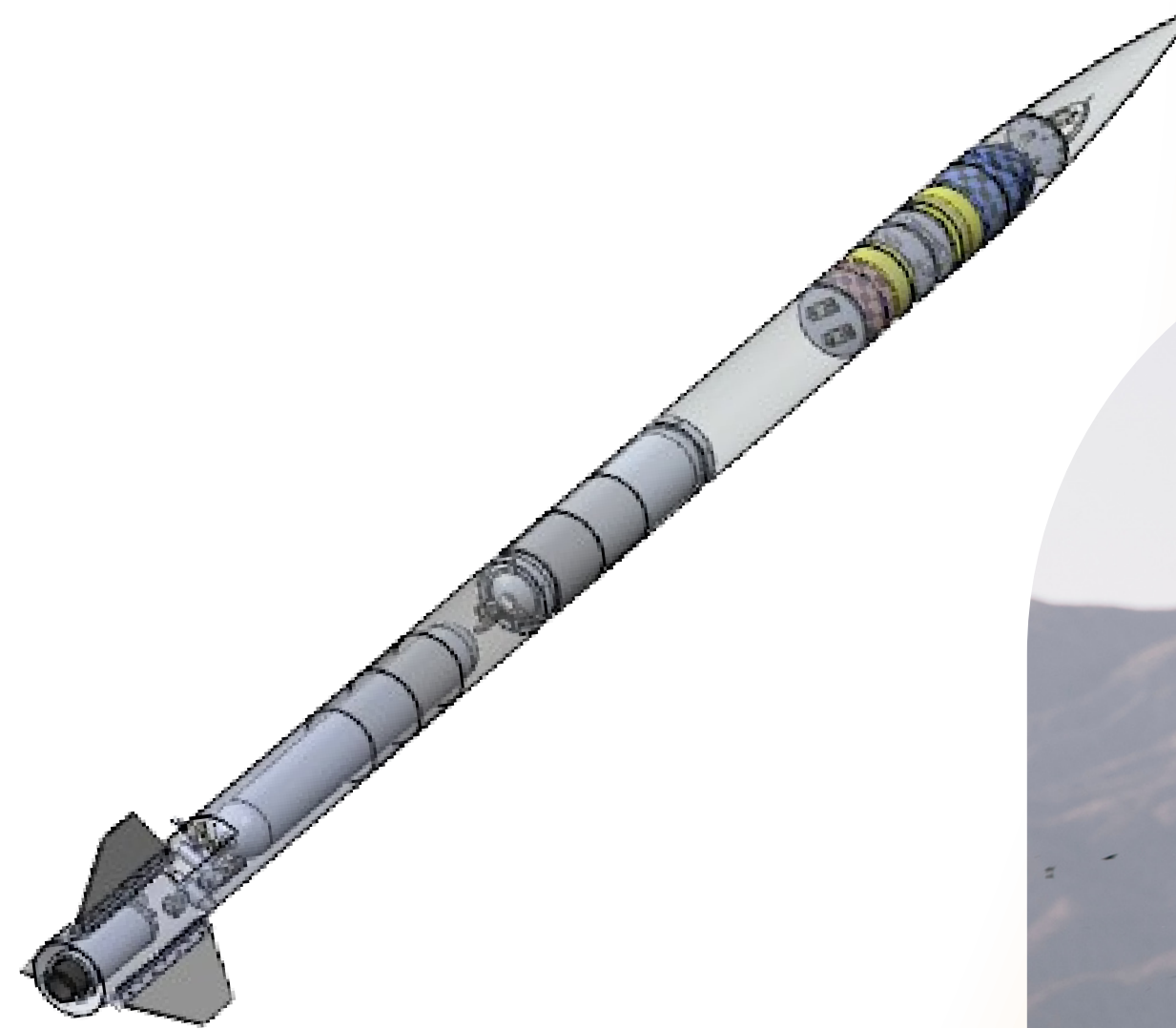
Spaceport America Cup
Begins

Spring 2023

Staging & Recovery
Design



CALDERA Timeline



What is ALULA?

- STAR's **first liquid bi-propellant rocket!**
- This is an extension of our previous project ELLIE!

Objectives

- Create modular launch platform for success in liquid competition
- Advance technical engineering skills
- **First launch planned for March 2024!**

Assembled system, April 2023

ALULA

Advanced Long-Utility Liquid Ascent Module



What is BEAREALIS?

- A rocket designed for the ALULA engine flown on a solid motor to test recovery and avionics

Outcomes

- 2nd **successful ALULA hotfire!** Now preparing for the 3rd
- BEAREALIS had a **flawless flight and recovery**
- Received **live telemetry** for the first time in STAR history

ALULA

BEAREALIS Solid Demonstrator and 2nd Hotfire 11/18-11/19



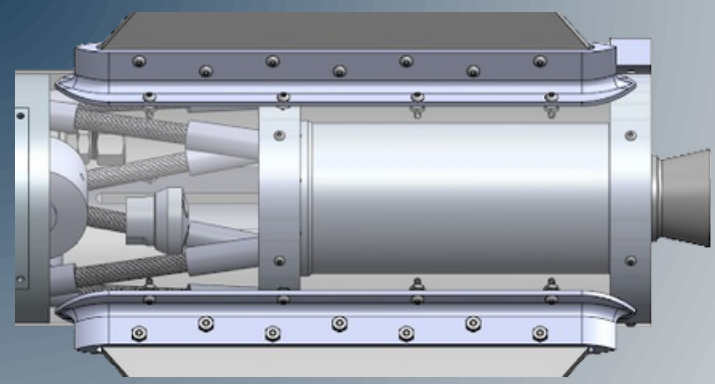
ALULA

2nd Hotfire 11/18/23



ALULA

BEAREALIS Solid Demonstrator 11/19/23

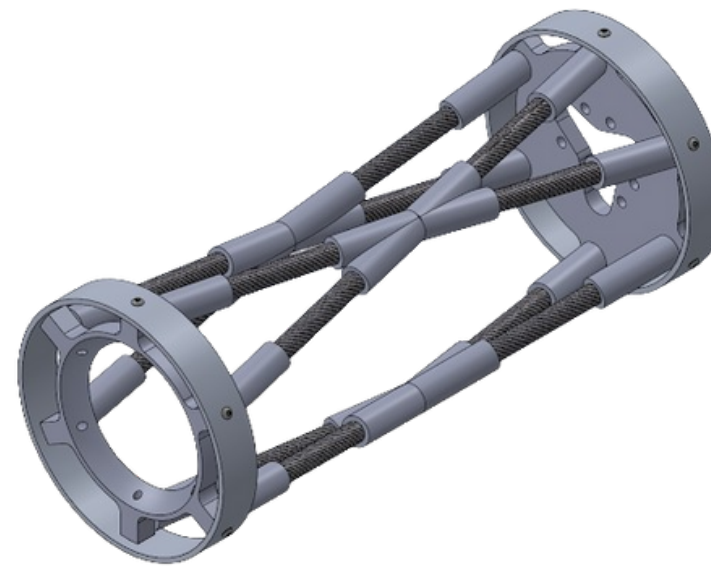


Flight Vehicle Design

Structures, vibrations, flight avionics, recovery

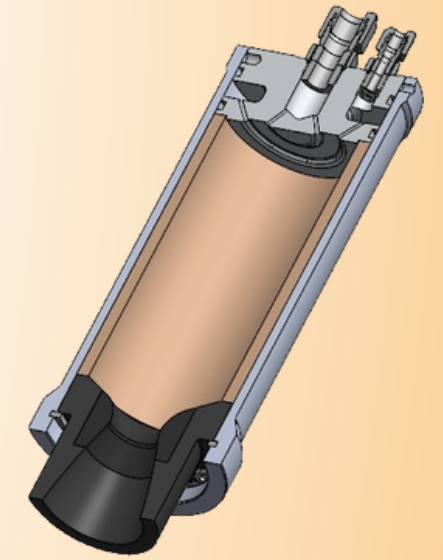
Component Fabrication, Testing

Fluid & cryo testing injector, pyro valve, and ground equipment



Solid Demonstrator Launch

Alula's rocket was successfully launched and recovered on a solid motor



Launch!

Final assembly, procedural review, launch!

Fall 2022

Spring 2023

Fall 2023

Nov 19th

Winter 2023/2034

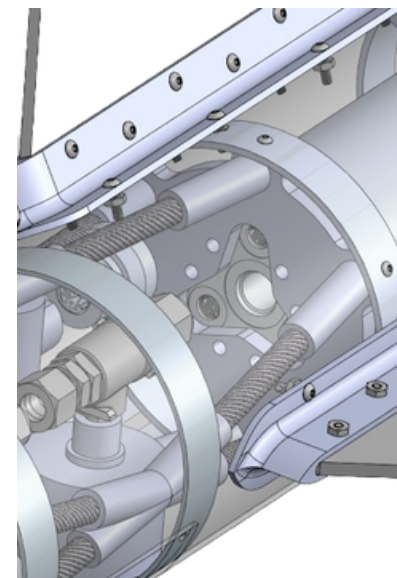
March 2024

Design & Fabrication

fabricate thruster, propulsion-flight integration continues

Hotfire Testing

Two successful hotfires, testing our propulsion system & ground support equipment

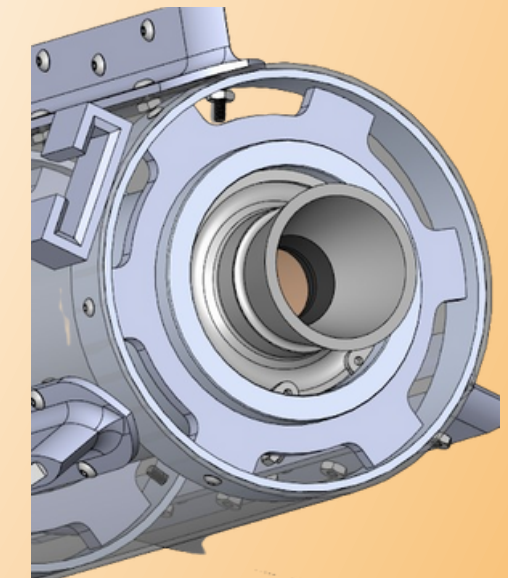


Optimization

Update flight model and optimize thrust curve

Flight Critical Design Review

Finalize Flight Vehicle Design



Timeline

STAR SCHOLARSHIP PROGRAM

Remove barriers of entry in STEM for women of color by providing sponsorship and workshops!

This year, we are offering 4, \$2000 scholarships in partnership with Mechanics Bank

\$5,000 (the lowest estimate of living costs for one semester)
- **\$3,000** (the max amount usually given by scholarship funds)
= **\$2,000** (the amount we give to make up the deficit)



Statistics

Women of Color are dramatically underrepresented in STEM fields. 47% of students working more than 15 hours a week have a GPA lower than the required passing grade.



Workshops

In addition to financial assistance, we host workshops centered around college applications and developing professional skills. Topics include selecting schools to apply to, crafting a personal profile, and essay-writing as well as college interviews, building resumes, and networking.

Diversity, Equity, & Inclusion

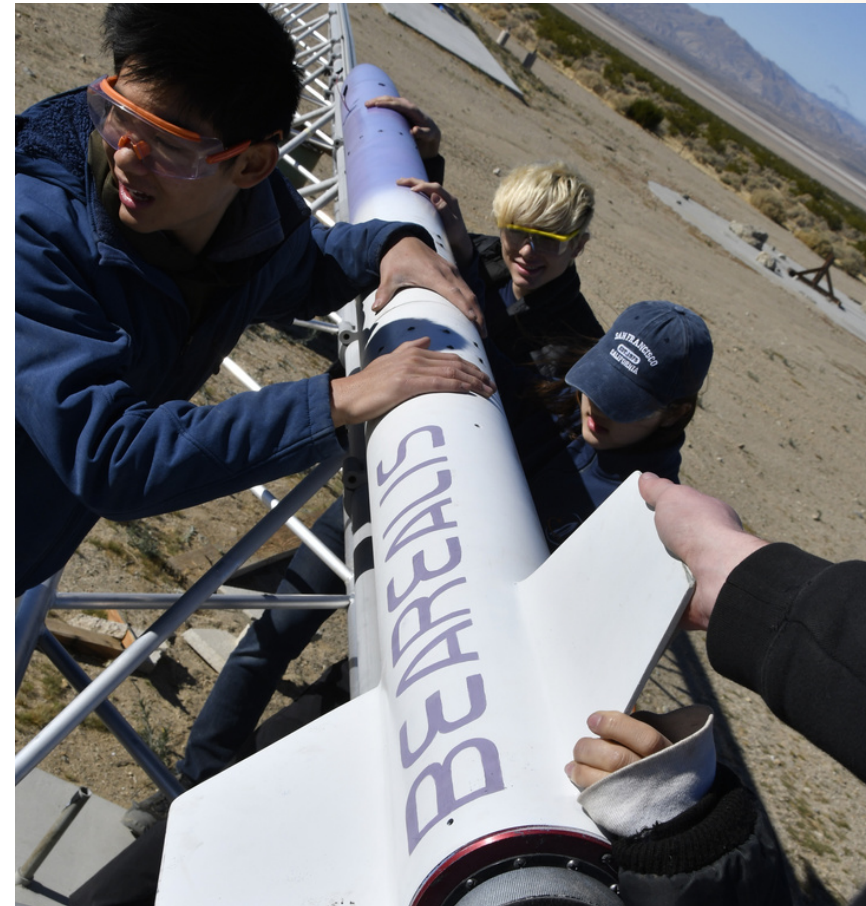
We believe in having no barriers to entry. We accept all students, regardless of background, major, race, gender, orientation, or ability on our team, and go above and beyond to ensure that everyone has a safe space to achieve their goals here at STAR.

- Our club holds a **better gender ratio than Berkeley Engineering**
- We take provide **active mentorship** in and out of the club, where students are placed with mentors that guide them through their work on the team.
- No club dues



WHAT STAR REPRESENTS

- STAR is the **LARGEST** engineering team on campus with over **130 ACTIVE MEMBERS**
- We provide all members with engineering training and ask for **NO MEMBERSHIP FEES**
- We run **2 MAIN technical projects**
- Most successful launch history
- **Hold the Cal apogee record**
- We have an active alumni network (200+)
- We have hosted career presentations with NewSpace and have invited hundreds of students to attend → actively handing students career opportunities
 - Boeing
 - Blue Origin
 - General Motors
 - And more!



ONLY LIMITING FACTOR THIS YEAR IS BUDGET!



We need more funding than ever before to fund our projects and reach our goals:

- 30,000 foot apogee competition vehicle
 - Motor costs: 6000 dollars
- Liquid Engine Experimental Vehicle
- Testing and manufacturing equipment
- Cutting individual member launch fees

Budgets available upon request

Sponsorship Tiers

Thanks for supporting our dreams and mission! Here are the sponsorship tiers for joining our sponsor group:

| | Website | Work Posting | Logo On Rocket | Recruitment | Resume Book |
|---------|---------|--------------|----------------|-------------|-------------|
| \$300 | ✓ | ✗ | ✗ | ✗ | ✗ |
| \$500 | ✓ | ✓ | ✗ | ✗ | ✗ |
| \$1000 | ✓ | ✓ | ✓ | ✗ | ✗ |
| \$2000 | ✓ | ✓ | ✓ | ✓ | ✗ |
| \$4000+ | ✓ | ✓ | ✓ | ✓ | ✓ |

Website: We will proudly publicize your company as one of our partners/sponsors on our website.

Work Posting: We will share any work/intern opportunities from your company to our members, and help connect interested students with you.

Logo on Rocket: We will put your company's logo on our annual competition rocket.

Recruitment: We will help you set up recruitment events (up to 2 per semester) dedicated to your company on campus and communicate with our organization members directly.

Resume Book: We will put together a collection of member profiles that fit your requirements, assisting you in searching for prospective employees.



All links/raw data on budget can be provided upon inquiry.

Official Website:

<https://stars.studentorg.berkeley.edu>

Got Questions? Email:

contact@stars.berkeley.edu

Connect with us

