



Cornell Mars Rover

RECRUITMENT FALL '26

First-Year/transfer
application due:

Oct. 16 @ 11:59pm



APPLY



6~4014

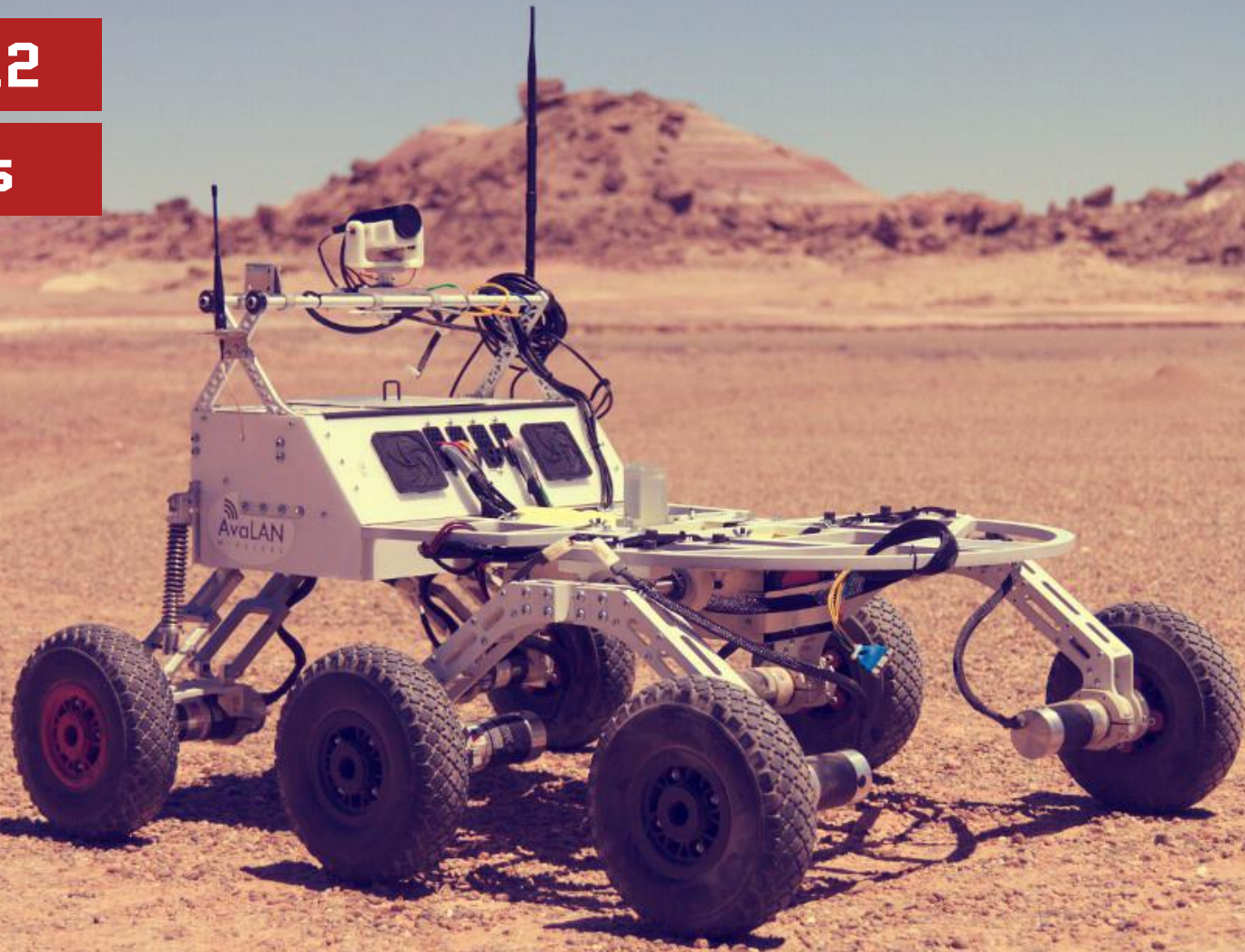
SUBTEAMS

MEMBERS

ROVERS

2012

Eos



2013

Helios



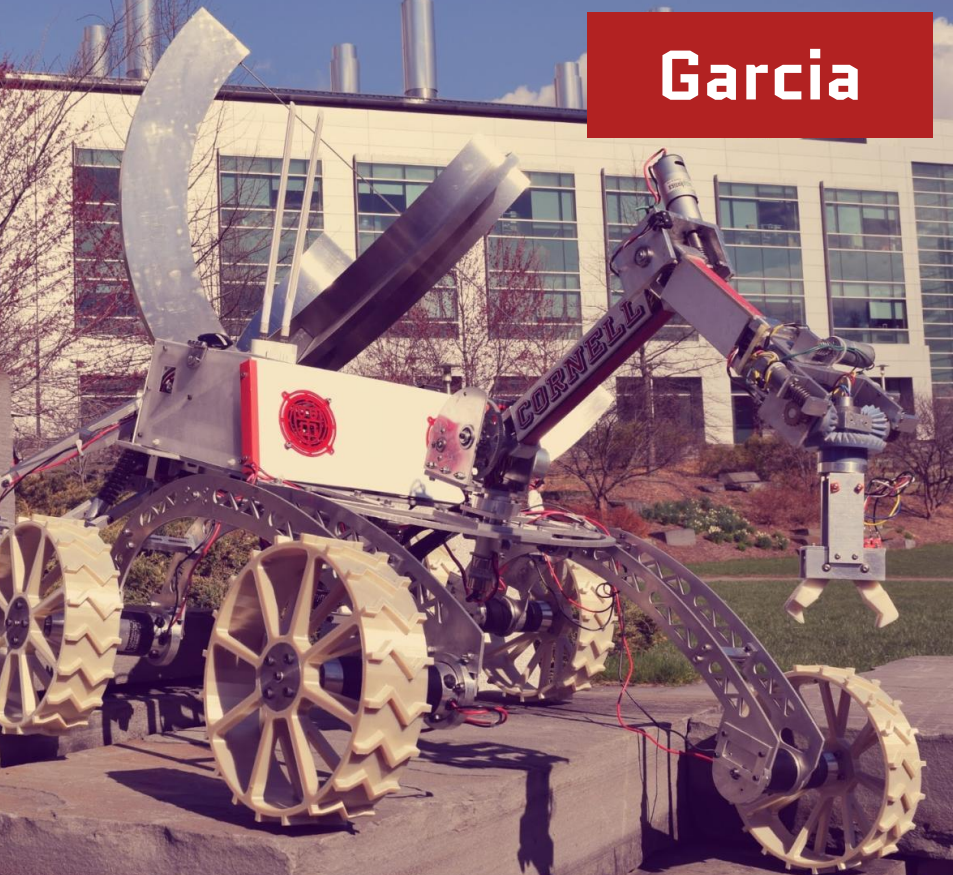
2014

Ares



2015

Garcia



2016

Chronos





2017

Athena

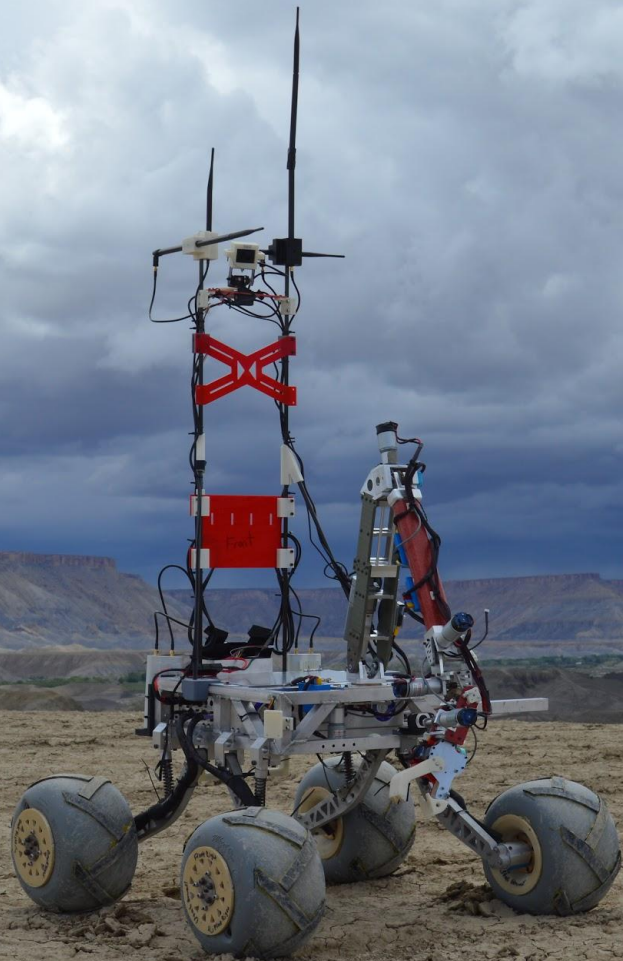


2018

Valkyrie

2019

Artemis



2020

Argos

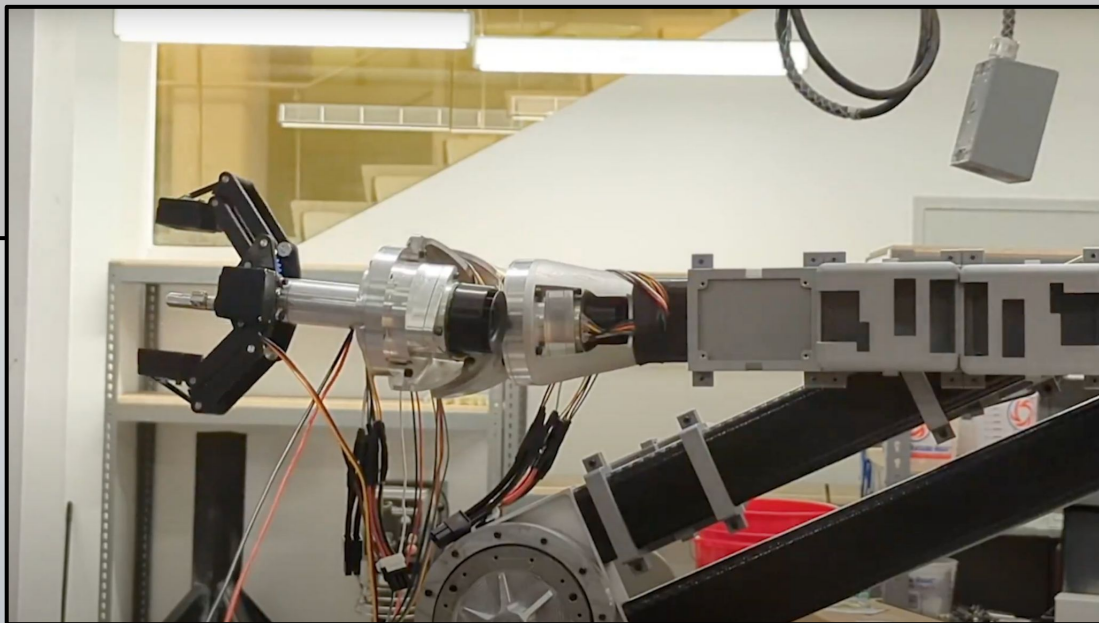
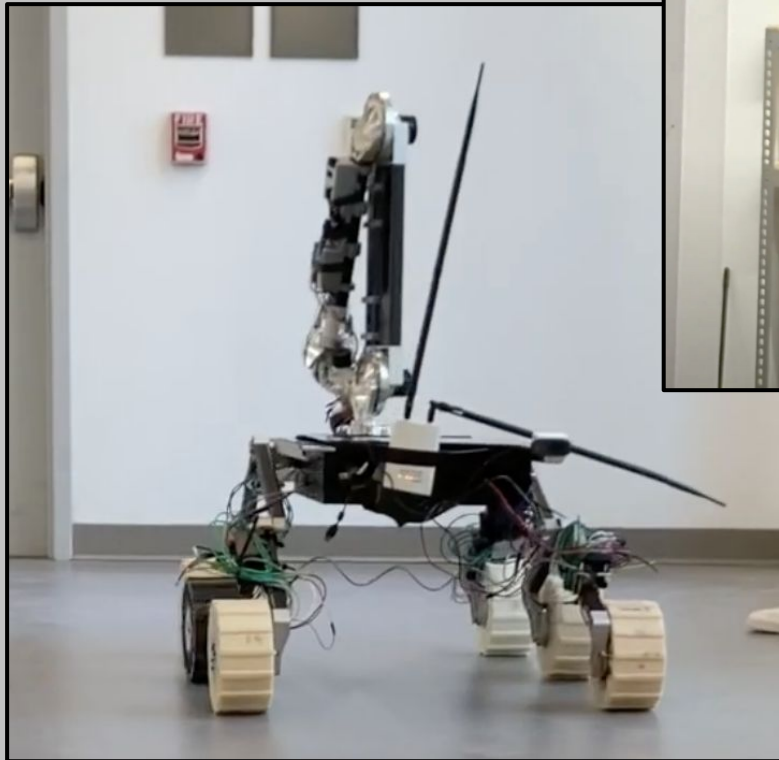


2021



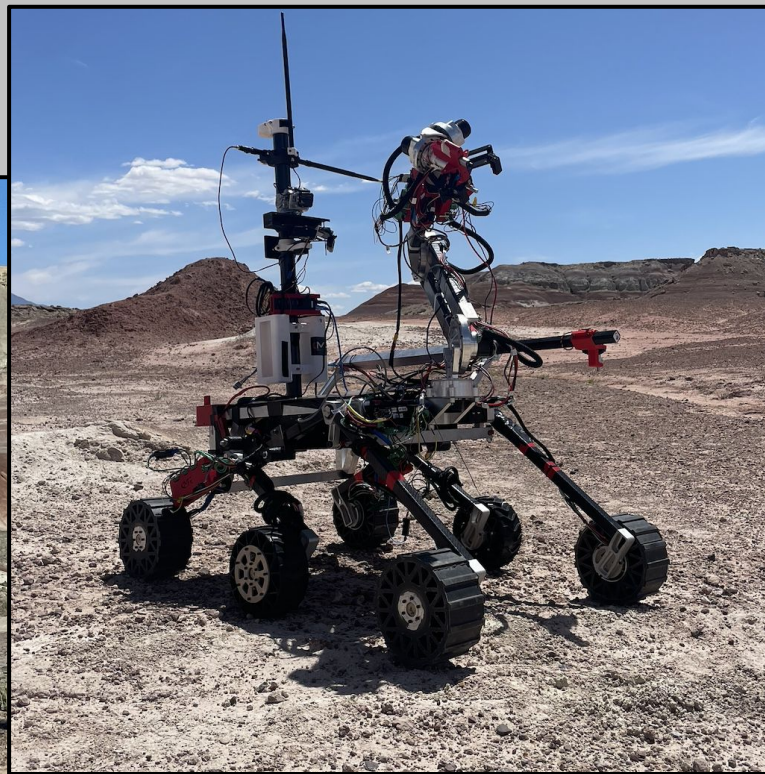
Odyssey

2022



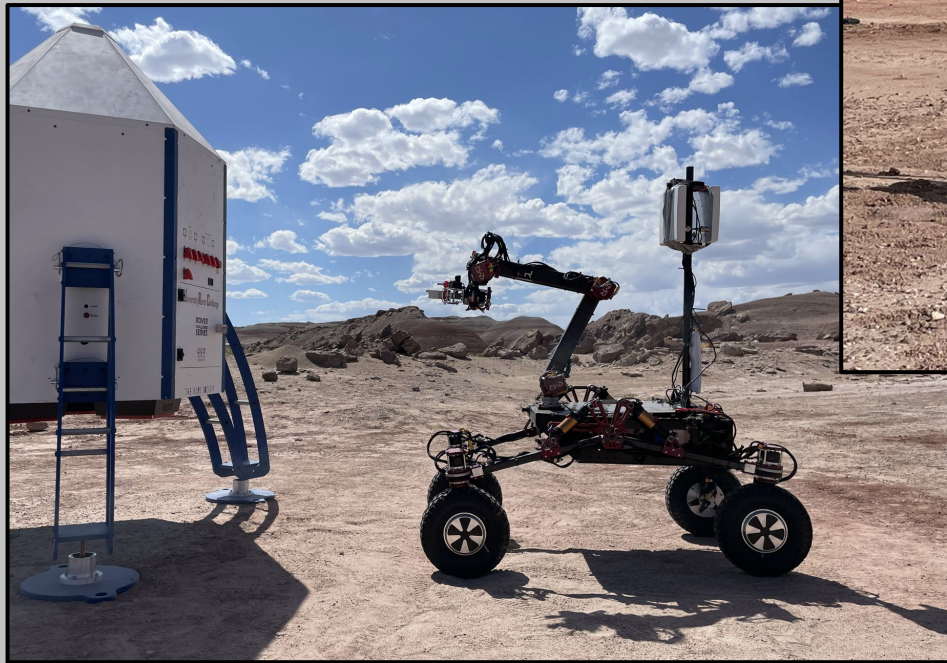
Orion

2023



Atlas

2024



Hyperion

2025



Cayuga

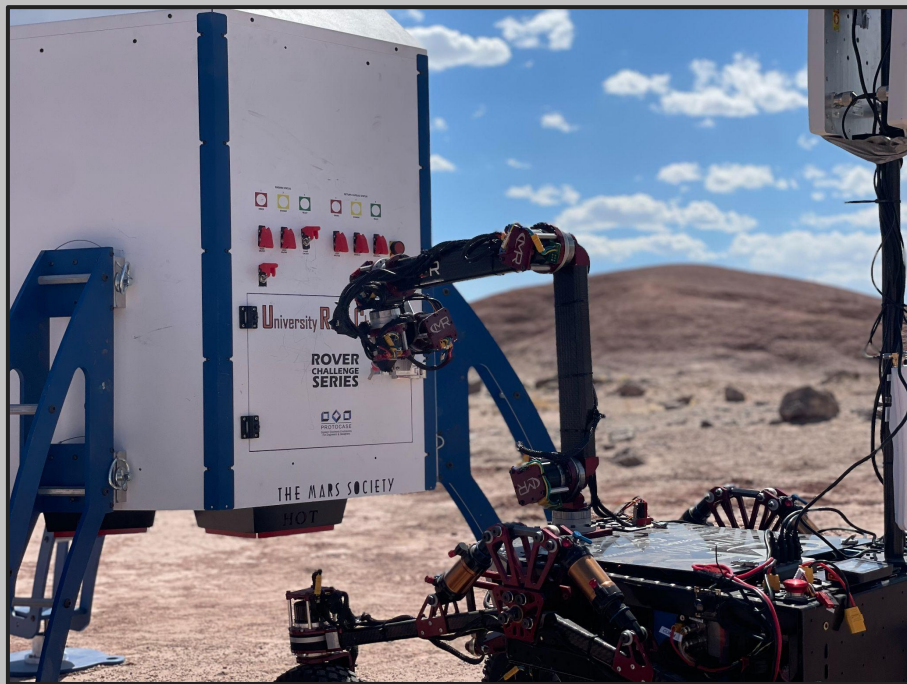
2026



Cerberus

UNIVERSITY ROVER CHALLENGE





Equipment Servicing

"perform several dexterous operations on a mock-up equipment system"

Rover must:

- Push buttons
- Flip switches
- Turn knobs
- Operate a screwdriver
- Type on a keyboard
- Open latches

Extreme Delivery Mission

"pick up and deliver objects in the field, and deliver assistance to astronauts"

Given GPS coordinates needed to:

- Pick up and deliver objects (ex. screwdrivers, hammers, toolboxes, rocks)
- Traverse a wide variety of terrain (ex. soft sandy areas, rock and boulder fields, vertical drops)





Science Cache

"conduct in-situ analysis with the rover, including life detection testing of samples"

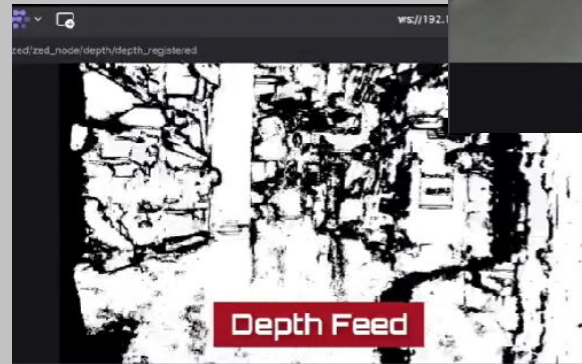
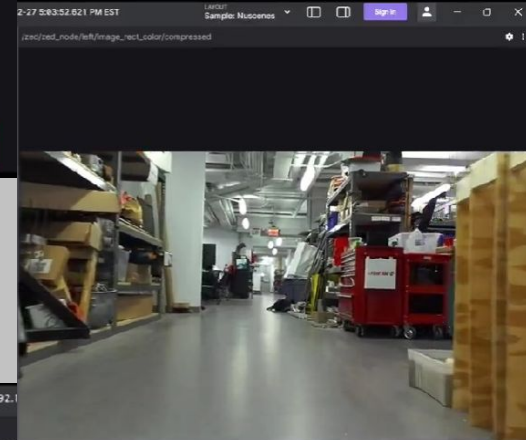
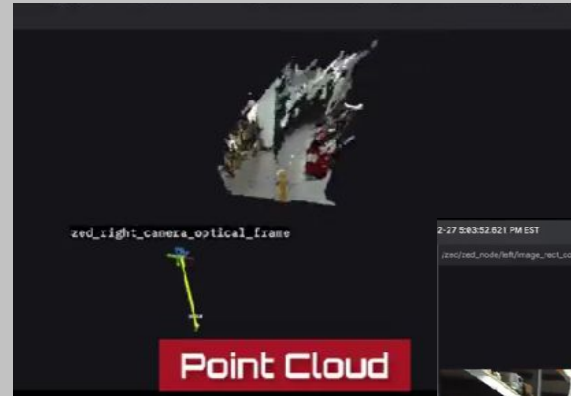
- Investigate sites of biological interest
- Conduct analysis of samples entirely on board the rover
- Determine the presence or absence of life at designated sites
- Present results, analysis, and conclusions

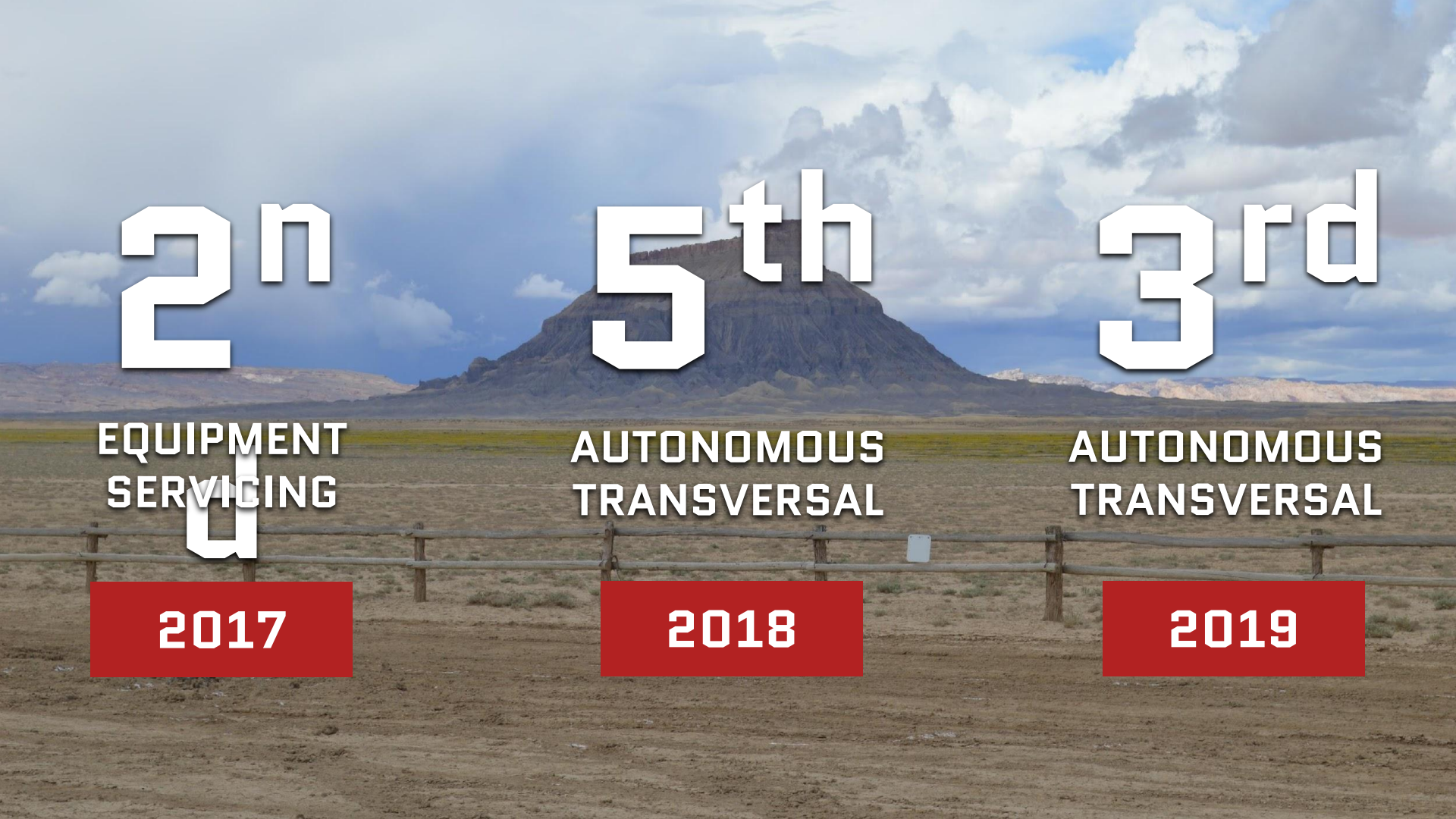
Autonomous Traversal

"autonomously traverse between markers in this staged mission across... difficult terrain"

As given GPS coordinates get increasingly vague, operators give commands from the base station to:

- Locate AR Tags
- Locate Key Objects
- Avoid obstacles





2ⁿ

EQUIPMENT
SERVICING

2017

5th

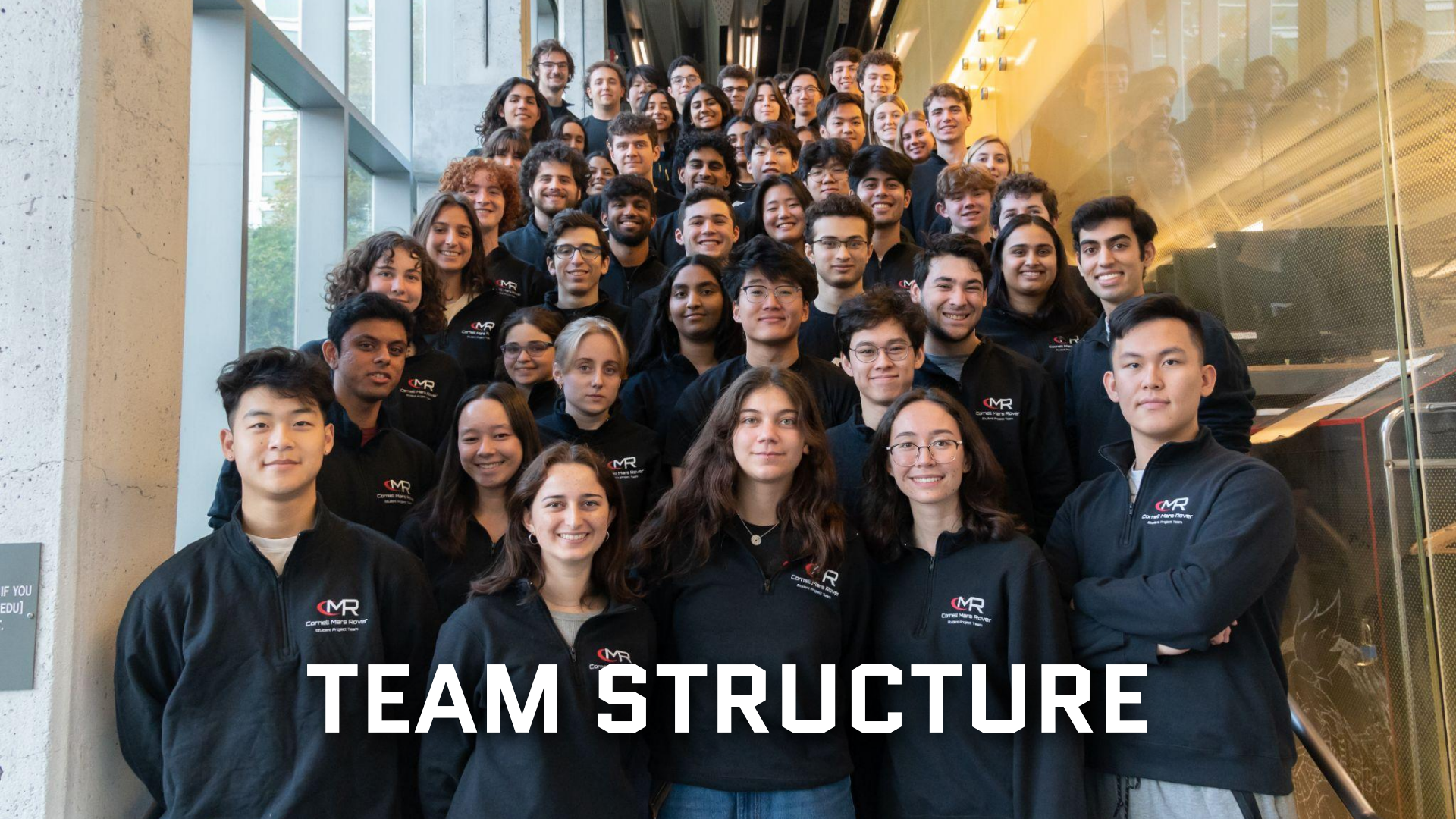
AUTONOMOUS
TRANSVERSAL

2018

3rd

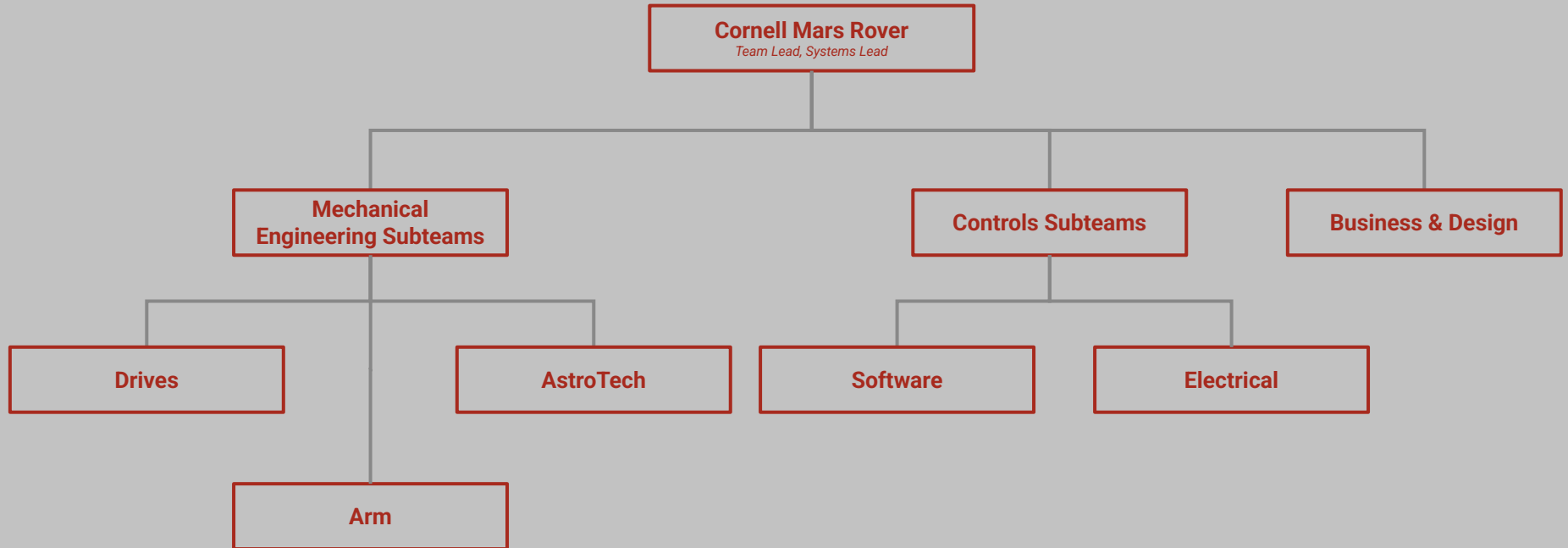
AUTONOMOUS
TRANSVERSAL

2019



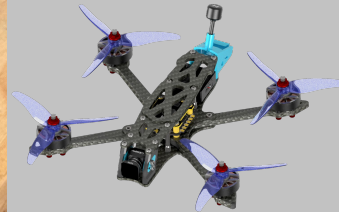
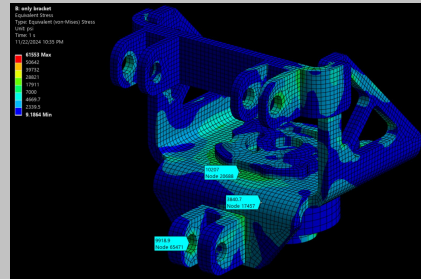
TEAM STRUCTURE

Overall Structure



Drives

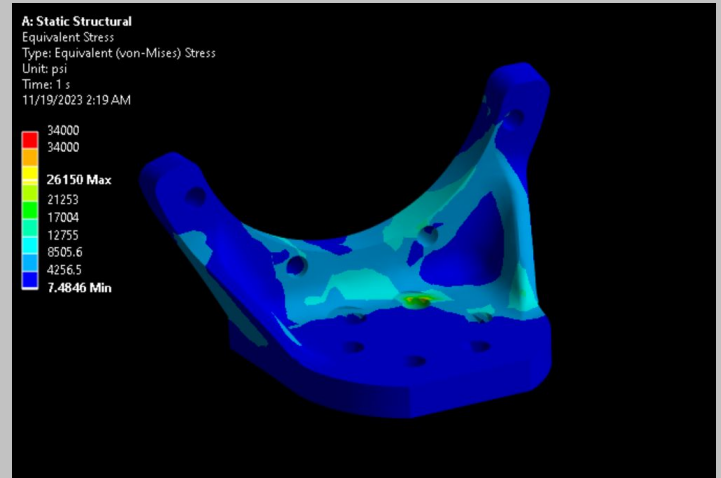
- Independent 4-bar Suspension
- Omnidirectional Swerve Drivetrain
- Fully enclosed Sheet Metal Frame
- Drone Development
- Custom-built Wheel Actuators



Arm

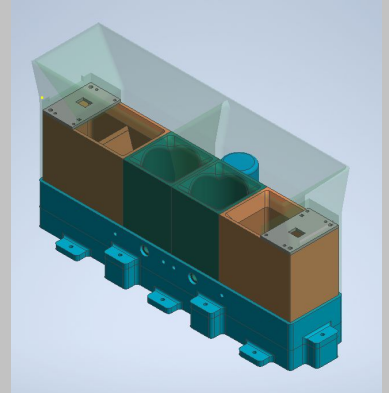
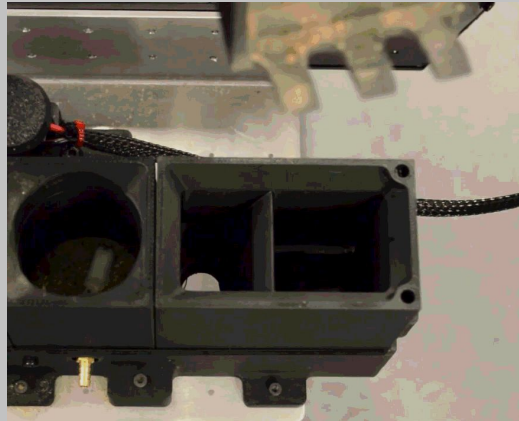
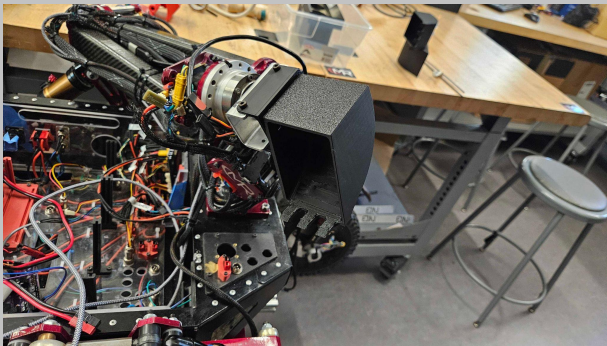
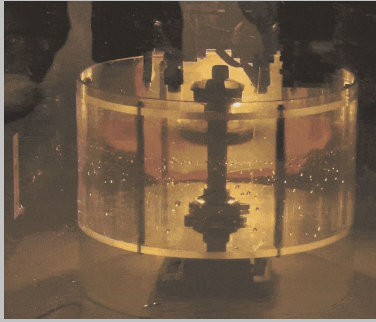
- **End Effector** - Allow arm to manipulate a variety of objects
- **Structure** - Lightweight and stiff supports
- **Gearboxes** - Move the arm while achieving zero backlash

Arm Extension Animation



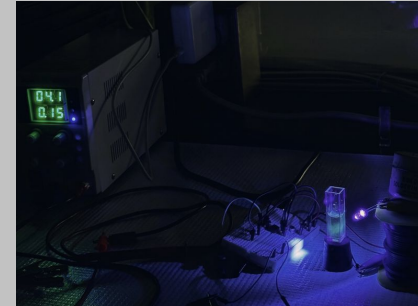
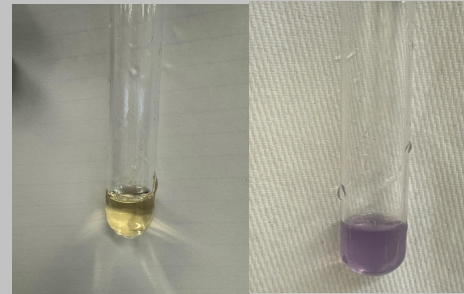
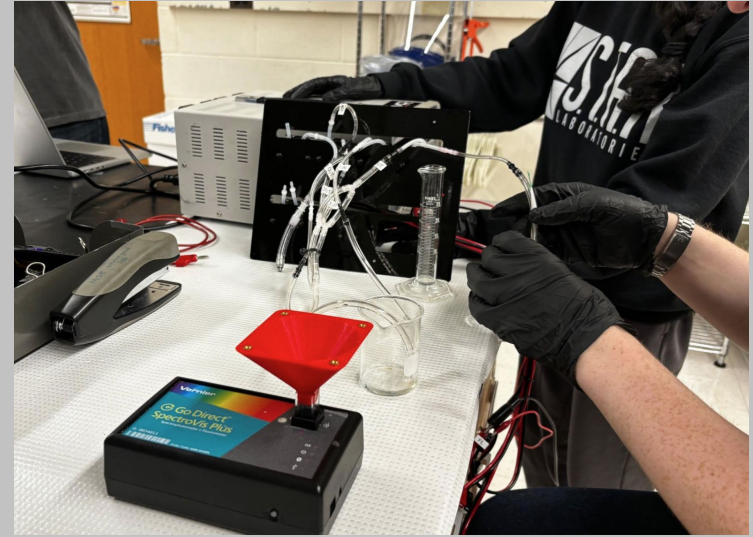
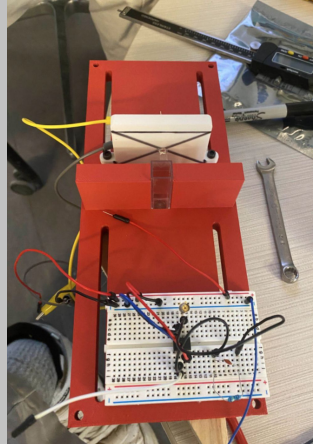
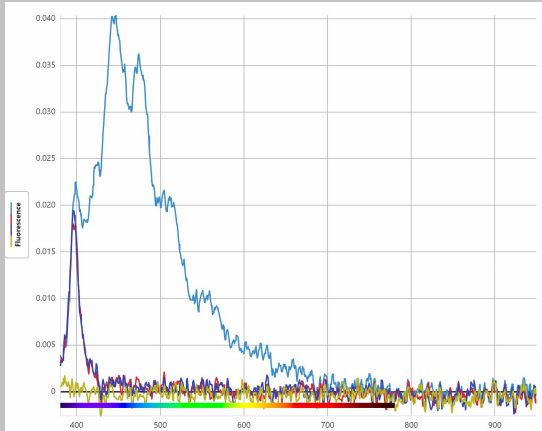
AstroTech

- “Astrobiological Technology”
- **On-board life-detection lab**
- Sub-systems: Collection, mixing, analysis
- **New stuff:** Auger, raman spectroscopy, in-house microscope



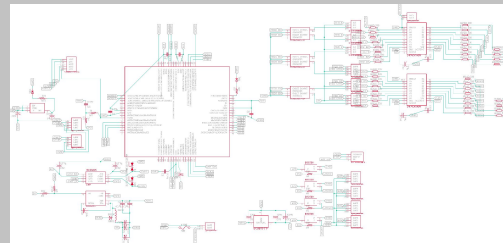
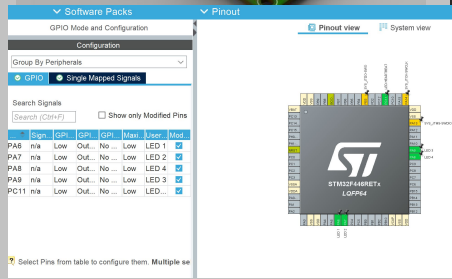
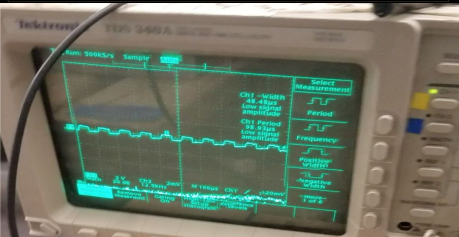
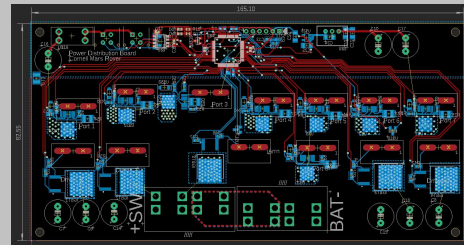
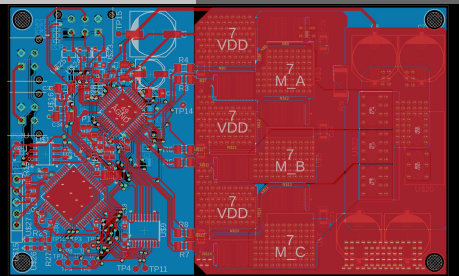
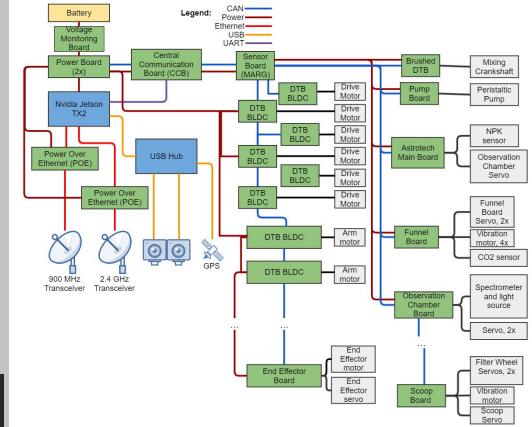
AstroTech Research

- Goal: Look for **extinct, extant, and present life**
 - Soil analysis for organic compounds
 - Geological analysis
- Experimental testing and data analysis applying chemistry, biology, and geology



Electrical

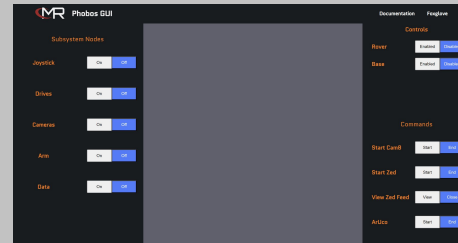
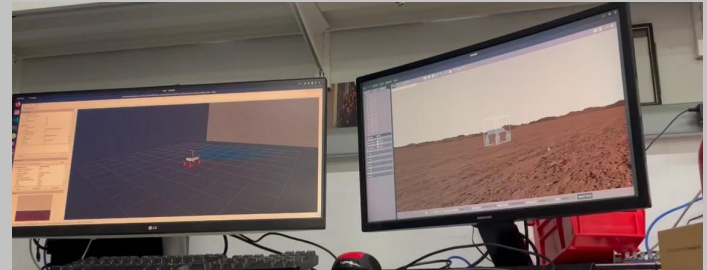
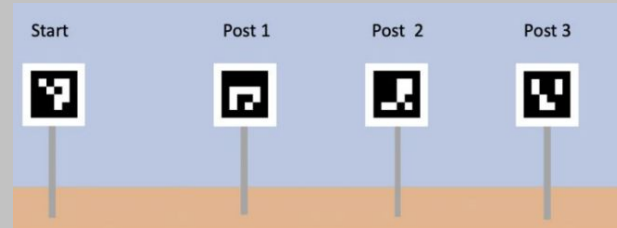
- Develop rover electronics from the ground up
- Build flexible systems to meet a wide range of mechanical and CS requirements
- Circuit Design and Analysis, PCB Design, Microcontroller Programming, Motor Control, Sensors, Embedded communication protocols



Software

We work with a variety of languages and frameworks to design and implement software for operating the rover [ranging from Machine Learning to Hardware Integration]

- Autonomy Stack: e.g. ML, Point Cloud object detection, AR Tag detection, autonomous navigation
- Controls Stack: Robot movement, arm movement, swerve drive
- Arm control via inverse kinematics
- AstroTech Hardware Integration e.g. spectrometer
- 3D Rover Simulation for autonomy and control, simulation for arm movement
- ROS - the industry standard [meta] OS for robotics [mainly Python, some C++]



Any questions?
email Software Co-Leads
ss3576@cornell.edu
djl364@cornell.edu

Business & Design

- Web design, graphic design, social media, video editing, and finance
- Fundraise, budget, work with large scale sponsors, and reach out to other students and the local community





CORNELL
MARS
ROVER

Section 1 of 3

CMR Order Form 2023-2024

B I U G X

If you need to cancel any orders or have questions, email or slack the Business subteam.

Your Name *

Short answer text





Our Sponsors:

ASML

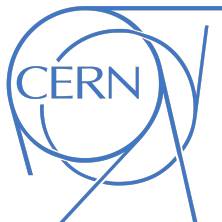
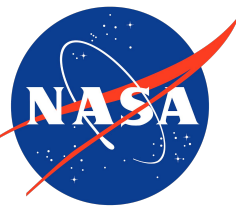


Procurify

TERADYNE



Where We Work:



FAQs

Q: What experience do you look for in first-year applicants?

A: We don't expect first-years to have any sort of technical experience. We are looking for passionate and driven individuals who are excited to build a rover!

Q: How many first-years do you expect to bring onto the team this cycle?

A: We don't know! We don't go into recruitment with a set number of spots to fill, the number of first-years that we bring onto the team depends on the applicant pool.

Q: What does the time commitment look like for a first-year?

A: When onboarded in the fall you do CMR on a volunteer basis, but we expect about 4-6 hrs of work a week. In the spring you would enroll in ENGRG 1400 for 1 credit. Next fall, you would enroll in CMR for 3 credits.

Q: What does the recruitment process look like?

A: About a week after applications close we send out invitations for interviews. Interviews are about 20 mins where we ask a series of behavioral questions and technical questions to see how you think.

Q: How many subteams can I apply to?

A: Up to 2, you rank your first and second choices (second choice optional).

Q: Do you do coffee chats?

A: No. We get a ton of applicants and our members are too busy building our rover to meet with all of you! You can always email with questions.

APPLICATION

A four-wheeled robotic rover is positioned in a vast, arid desert landscape under a blue sky with scattered clouds. The rover has a black chassis, large treaded tires, and a white sensor box mounted on a pole. In the background, a small, rounded desert hill (pyramid) is visible. A small white flag with a black symbol is planted in the sand to the right of the rover.

RECRUITMENT FALL '26

Info Session:

TBD

First-Year/Transfer
application due:

TBD

Apply Now!

THANK YOU!

Any Questions?

NEXT INFO SESSION 9/08 6:00PM
Hollister 366



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cornellmarsrover@gmail.com



marsrover.engineering.cornell.edu/



Cornell Mars Rover Project Team